



The Bancroft Library

University of California • Berkeley

Regional Oral History Office
The Bancroft Library

University of California
Berkeley, California

Western Mining in the Twentieth Century Series
Knoxville/McLaughlin Mine

Hugh C. Ingle, Jr.

INDEPENDENT SMALL MINES OPERATOR, 1948 to 1999; CORONA MINE

With an Introduction by
John S. Livermore

Interviews conducted by
Eleanor Swent
in 1998 and 1999

Since 1954 the Regional Oral History Office has been interviewing leading participants in or well-placed witnesses to major events in the development of Northern California, the West, and the Nation. Oral history is a method of collecting historical information through tape-recorded interviews between a narrator with firsthand knowledge of historically significant events and a well-informed interviewer, with the goal of preserving substantive additions to the historical record. The tape recording is transcribed, lightly edited for continuity and clarity, and reviewed by the interviewee. The corrected manuscript is indexed, bound with photographs and illustrative materials, and placed in The Bancroft Library at the University of California, Berkeley, and in other research collections for scholarly use. Because it is primary material, oral history is not intended to present the final, verified, or complete narrative of events. It is a spoken account, offered by the interviewee in response to questioning, and as such it is reflective, partisan, deeply involved, and irreplaceable.

All uses of this manuscript are covered by a legal agreement between The Regents of the University of California and Hugh C. Ingle, Jr., dated November 6, 1998. The manuscript is thereby made available for research purposes. All literary rights in the manuscript, including the right to publish, are reserved to The Bancroft Library of the University of California, Berkeley. No part of the manuscript may be quoted for publication without the written permission of the Director of The Bancroft Library of the University of California, Berkeley.

Requests for permission to quote for publication should be addressed to the Regional Oral History Office, 486 Library, University of California, Berkeley 94720, and should include identification of the specific passages to be quoted, anticipated use of the passages, and identification of the user. The legal agreement with Hugh C. Ingle, Jr., require that he be notified of the request and allowed thirty days in which to respond.

It is recommended that this oral history be cited as follows:

Hugh C. Ingle, Jr., "Independent Small
Mines Operator, 1948 to 1999; Corona
Mine," an oral history conducted in 1998
and 1999 by Eleanor Swent, Regional Oral
History Office, The Bancroft Library,
University of California, Berkeley, 2000.

Copy no. 1



Hugh Ingle at the Ashby Mine, 1993.

Cataloging information

Ingle, Hugh C., Jr. (1923-1999)

Small-scale miner, prospector

INDEPENDENT SMALL MINES OPERATOR, 1948 to 1999; CORONA MINE, 2000, xvii, 181 pp.

Growing up with mining: pocket and placer gold mines in Oregon; Naval Air Reserve fighter pilot, 1943-1983, combat in Korea; Corona Mine, CA, operations and mercury recovery processes, 1955-1970, reclamation 1998-1999; managing and operating other small mines in California and Nevada; mining consultant in Brazil, Congo, Mexico; coal mine research for U.S. Bureau of Mines; service on Nevada Commission on Mineral Resources, 1991-1999; discusses mine safety, solving geological and metallurgical problems, ore sampling and grade control, peculiarities of manganese, dredging for tantalum, mine leasing, adverse effect of government regulations on small mines.

Introduction by John S. Livermore, Partner, Cordilleran Exploration Company; President, Public Resource Associates.

Interviewed in 1998 and 1999 by Eleanor Swent for the Western Mining in the Twentieth Century series. The Regional Oral History Office, The Bancroft Library, University of California, Berkeley.

DONORS TO
THE KNOXVILLE DISTRICT/McLAUGHLIN MINE PROJECT OF
THE WESTERN MINING IN THE TWENTIETH CENTURY ORAL HISTORY SERIES
1993-1999

The Regional Oral History Office, on behalf of future researchers, would like to express its thanks to the following corporations, organizations, and individuals whose encouragement and support have made possible this oral history project of the Knoxville District/McLaughlin Mine.

Corporations and Organizations

Bechtel Foundation
Chemstar Lime Company
The Gamble Foundation
The Hearst Foundation, Inc.
Homestake Mining Company
Mining and Metallurgical Society of America
One Shot Mining Company

Individuals

Anonymous, in memory of Donald Delicate
Anonymous, in memory of Robert S. Livermore
Christine W. S. Byrd, in memory of Langan W. Swent
Kenneth S. Canfield
Rosemary and Harry Conger
Douglas W. and Margaret P. Fuerstenau
Launce E. Gamble
James and Virginia Hickey
William A. Humphrey
James Jensen
Kritikos Family, in memory of William Kritikos
John S. Livermore
Roger A. Madsen
Sylvia C. McLaughlin
Marion Onstad
Mr. and Mrs. Richard J. Stoehr
Eleanor Swent, in memory of Langan Swent
Jack Thompson
and
The J. Ward Downey Bequest Fund

TABLE OF CONTENTS--Hugh Ingle

| | |
|---|-----|
| INTRODUCTION TO KNOXVILLE/McLAUGHLIN PROJECT by Duane A. Smith | i |
| PROJECT HISTORY by Eleanor Swent | v |
| INTRODUCTION TO HUGH C. INGLE, JR., by John S. Livermore | x |
| INTERVIEW HISTORY by Eleanor Swent | xii |
| BIOGRAPHICAL INFORMATION | xv |
| I OPERATING THE CORONA MINE FROM 1955 TO 1970 | 1 |
| Intriguing Because of Metallurgical Problems | 1 |
| Partnership with Taylor-Knapp | 2 |
| Bringing the Furnace from Wilbur Springs | 4 |
| Opening Up the Old Mine Workings | 6 |
| Atlas-Copco Drills | 7 |
| Solving the Metallurgical Problems | 7 |
| Trying a Borrowed Pipe Retort | 9 |
| Assays Reveal Presence of Oil | 10 |
| Working with a Parallel-Flow Furnace | 12 |
| Constructing a Condenser System from Various Sources | 13 |
| Processing Ore from a Subdivision near New Almaden | 14 |
| Cleaning Out the Old Tuff Condensers Profitably | 14 |
| The Old Corona Retorts | 17 |
| Getting Access to the Corona Mine | 34 |
| II GROWING UP WITH MINING | 36 |
| Helping in a Pocket Gold Mine at the Age of Ten | 36 |
| Hugh Ingle, Sr., a Mining and Civil Engineer | 37 |
| Building Airports for the Army Air Force | 38 |
| Working Placer Mines in Oregon and Hunting for Survival | 38 |
| A Hard Life, But Satisfying | 40 |
| Mining with Picks, Monitors, and Pans | 42 |
| Creating a Device to Lift Large Boulders Out of the Workings | 42 |
| Mining Just for Subsistence | 43 |
| Panning Even the Crows of Birds | 45 |
| III WORLD WAR II BEGINS A FORTY-YEAR CAREER AS A NAVY FIGHTER PILOT | 48 |
| Mackay School of Mines Trains "Desert Rats" | 48 |
| Navy Flight Training, 1943 | 49 |
| Flying the Bearcat, the Best Fighter Ever Built | 51 |
| Serving in Korea with the Naval Air Reserve | 53 |
| IV INDEPENDENT MINE OPERATOR | 57 |
| Learning How Not to Take Samples | 57 |
| A Losing Venture Leasing an Antimony Mine in 1948 | 58 |
| Helping the Neighbors | 60 |

| | | |
|------|--|-----|
| | Volo Mining Company: Shares, a Meager Salary, and Poor Samples | 61 |
| | Setting Grade Stakes for the Highway Department | 66 |
| V | TAYLOR-KNAPP MANGANESE MINE, 1952 TO 1957 | 67 |
| | Engineer to Superintendent | 67 |
| | Careful Control of the Grade of Concentrates Shipped | 69 |
| | An Ingenious Rebuild of a Pump to Dewater a Shaft | 71 |
| | Al Taylor Believed in Honesty | 73 |
| VI | MORE ABOUT THE CORONA MINE OPERATION | 75 |
| | A Mine That Appealed Because of Its Problems | 75 |
| | Good People to Work With | 79 |
| | Two Lessees Join the Effort | 80 |
| | Father, Mother, and Son Double Production | 80 |
| VII | CONSULTING WORK ON MERCURY FOR SURE MONEY | 84 |
| | Directing Exploration at the Helen Mine | 84 |
| | Francis Frederick a Good Teacher of Geology | 86 |
| | The Cactus Queen Mine, Ore in Troughs | 86 |
| | The Fascination of Small Mines: Detective Work | 87 |
| | The Independence Mine, Nevada, Over-Staffed | 88 |
| | The Altoona Mine, Trinity County | 89 |
| | Metacinnabar at the Reed Mine | 90 |
| | Dasco Mines, Hair-Raising Sampling of Carlots | 92 |
| | Mojave Mining and Milling, a Delicate Balance | 95 |
| | Examination for Union Carbide for Tantalum in the Congo | 95 |
| | A Maddening Placer Mine in Brazil in 1966 | 98 |
| | The Guadalupe and New Almaden Mines, Too Spooky | 103 |
| | Fruit Growers Supply: A Dead Duck Project | 104 |
| | Poor Mercury Prospects in Mexico | 105 |
| | Always Sample the Best Ore | 107 |
| VIII | A BRIEF PERIOD AS A BUREAUCRAT | 110 |
| | Doing Research for the Bureau of Mines at FMC Coal Mines | 110 |
| | The Value of Some Junior College English Courses | 112 |
| | Dick Ingle's Serious Auto Accident | 112 |
| IX | OPERATING SMALL MINES | 115 |
| | Hughie's Heroic Rescue Effort in a Talc Mine | 115 |
| | More Recollections of the Congo | 119 |
| | A Close Call in Blasting at the Corona Mine | 121 |
| | Methane in Some Mercury Mines | 122 |
| | Preventing Salivation in Mining Mercury | 122 |
| | Coping with Acid Water and Bad Air | 123 |
| | Surviving Being Shot Down Over Korea | 125 |
| | An Engineering Partnership with William Kritikos | 129 |
| | Powerine Oil Company and a Disastrous Copper Project | 132 |
| | Investigating a Placer Mine in the Desert | 135 |
| | Hornswoggled at the Talc Mine | 136 |
| | Service as Nevada Mineral Resources Commissioner | 137 |
| | A Bout with Cancer Delays Work | 138 |
| | The Mabel Mine Holds Promise of Good Ore | 140 |

| | |
|---|-----|
| Hughie Ingle, Invaluable Helper | 143 |
| The Crippling Effect of Regulations and Taxes | 144 |
| TAPE GUIDE | 154 |
| APPENDIX | |
| A | |
| Hugh C. Ingle, Jr. | |
| Professional Experience Record | 155 |
| Letter to Eleanor Swent of October 13, 1999 | 163 |
| Report on Corona Mine from <u>California Journal of Mines</u> | |
| <u>and Geology</u> , October 1939, vol. 35, #4 | 164 |
| Report on Mercury from <u>California Geology</u> , September | |
| 1971 | 165 |
| B | |
| Western Mining in the Twentieth Century Oral History | |
| Series | 166 |
| INDEX | 178 |

INTRODUCTION TO KNOXVILLE/McLAUGHLIN PROJECT by Duane A. Smith

Imagine, if you would, what it would be like to have a series of interviews from people of all walks of life from a nineteenth century mining town and district--for example, a Fiddletown, California; a Silver City, Idaho; or a Caribou, Colorado. Would it not be exciting to "hear" first hand the stories of miners, store owners, lawyers, teachers, and a variety of other folks that make up the mining West?

Such a series of interviews would be the perfect answer to the Roman statesman, orator, and philosopher, Marcus Tullius Cicero, who observed more than 2,000 years ago: "History is the witness that testifies to the passing of time; it illuminates reality, vitalizes memory, provides guidance in daily life, and brings us tidings of antiquity." Imagine, then, what the Knoxville/McLaughlin oral history project is going to mean to future generations.

The Knoxville, California, mining district has a long mining history. It started in the 1860s with mercury mining and continued into the 1990s with Homestake Mining Company's McLaughlin gold mine. Under the guidance of Eleanor Swent, and as part of the Regional Oral History Office's Western Mining in the Twentieth Century series, a comprehensive oral history project of this mining district was launched in 1993. These fascinating and significant volumes are the finished projects.

While obviously impossible to go back beyond the turn of the century, interviews were conducted with miners, ranchers, journalists, teachers, and merchants who were in the district before the arrival of Homestake. The words of these people provide an exciting look at a district in transition and decline. Then came Homestake and their world changed.

Some gold mines had been operated here in the nineteenth and twentieth centuries, but they were nothing like what occurred when a major mining company became interested. Homestake's geologists found enough gold to warrant development. The concept would be an open pit mine and mill that would impact Napa, Lake, and Yolo Counties in northern California for a generation and provide for the future.

Five and one-half years went into planning for the McLaughlin gold mine, including 327 approvals needed for the mine's development. Not only were some mining ideas new and ground breaking, but the operation was sitting in one of the most environmentally aware states in the country. Homestake spent over \$283 million in start-up costs, before mining commenced in March 1985. The first year's production of 83,836 ounces of gold showed that the planning and work had been worthwhile from a dollars-and-cents aspect. Homestake was proud of its operation.

"The McLaughlin mine is the site of the first successful commercial application of the autoclave processing technology for extracting gold from ores. The operation began production in 1985 and is a showcase for environmental responsibility."

Homestake would continue to mine the pit into 1996 when mining ceased, except for processing previously stockpiled lower-grade ore to be worked for approximately another eight years, "using a conventional direct cyanide leach process." Reclamation, which has been conducted simultaneously with mining, would also continue into the next century. As Homestake's annual report in 1995 stated, "Reclamation of mine waste dumps is scheduled for completion in the latter part of 1996 with the final placement of top soil and hydroseeding. The planting of oak trees and other indigenous vegetation will continue seasonally until the area is completely reclaimed."

All this makes the oral history project that much more exciting; it was conducted while the district still operated and memories were fresh and riveted on a host of topics and concerns. This multi-volume series covers almost every conceivable aspect and impact--it is a monument to a refreshing, innovative way of approaching mining history.

These volumes provide a case study of twentieth century mining, environmental issues, and regional concerns, the successes, failures, tensions, and developments that go to make up a 1980s and 1990s mining operation and the people involved from all walks of life. They are a gold mine of primary documentation and personal memories of an era that is passing into history. A perusal of the table of contents will give the reader an idea, but the interviews need to be "assayed" carefully to grasp the whole story of what went on at the McLaughlin mine and why its impact was so significant. This is a "high grade" effort all the way.

Cicero would be proud. These volumes do illuminate reality, vitalize memory, and provide guidance in daily life. Without question, they testify to the passing of time and will eventually bring "us the tidings of antiquity."

Duane A. Smith
Professor of History and
Southwest Studies

September 1997
Fort Lewis College
Durango, Colorado

Knoxville District/McLaughlin Mine Oral History Project

William Humphrey, *Mining Operations and Engineering Executive for Anaconda, Newmont, Homestake, 1950 to 1995, 1996*

Hugh C. Ingle, Jr., *Independent Small Mines Operator, 1948 to 1999; Corona Mine, 2000*

Patrick Purtell, *Maintenance and Management at the McLaughlin Mine, 1985 to 1997, 1999*

William Wilder, *Owner of One Shot Mining Company: Manhattan Mercury Mine, 1965-1981, 1996*

The Knoxville Mining District, The McLaughlin Gold Mine, Northern California, Volume I, 1998

Anderson, James, "Homestake Vice President-Exploration"

Baker, Will, "Citizen Activist, Yolo County"

Birdsey, Norman, "Metallurgical Technician, McLaughlin Process Plant"

Bledsoe, Brice, "Director, Solano Irrigation District"

The Knoxville Mining District, The McLaughlin Gold Mine, Northern California, Volume II, 1998

Cerar, Anthony, "Mercury Miner, 1935-1995"

Ceteras, John, "Organic Farmer, Yolo County"

Conger, Harry, "President, Chairman, and CEO, Homestake Mining Company, 1977 to 1994"

Corley, John Jay, "Chairman, Napa County Planning Commission, 1981 to 1985"

Cornelison, William, "Superintendent of Schools, Lake County" (Includes an interview with John A. Drummond, Lake County Schools Attorney)

The Knoxville Mining District, The McLaughlin Gold Mine, Northern California, Volume III, 1998

Crouch, David, "Homestake Corporate Manager-Environmental Affairs"

Enderlin, Elmer, "Miner in Fifty-Eight Mines"

Fuller, Claire, "Fuller's Superette Market, Lower Lake"

Goldstein, Dennis, "Homestake Corporate Lawyer"

Guinivere, Rex, "Homestake Vice President-Engineering"

The Knoxville Mining District, The McLaughlin Gold Mine, Northern California, Volume IV, 1998

Gustafson, Donald, "Homestake Exploration Geologist, 1975-1990"

Hanchett, Bonny Jean, "Owner and Editor, Clearlake Observer, 1955-1986"

Hickey, James, "Director of Conservation, Development, and Planning for Napa County, 1970 to 1990"

Jago, Irene, "The Jagos of Jago Bay, Clear Lake"
Jonas, James, "Lake County Fuel Distributor"
Koontz, Dolora, "Environmental Engineer, McLaughlin Mine, 1988-1995"

The Knoxville Mining District, The McLaughlin Gold Mine, Northern California, Volume V, 1998

Kritikos, William, "Operator, Oat Hill Mine"
Landman, John, "Rancher, Morgan Valley"
Lyons, Roberta, "Journalist and Environmentalist"
Madsen, Roger, "Homestake Mechanical Engineer"
Magoon, Beverly, "Merchant and Craft Instructor, Lower Lake"
McGinnis, Edward, "Worker at the Reed Mine"

The Knoxville Mining District, The McLaughlin Gold Mine, Northern California, Volume VI, 1999

McKenzie, Robert, "McKenzies in Monticello, Berryessa Valley"
Moskowite, Harold, "Napa County Supervisor"
Onstad, Marion, "Neighbor and Employee of the McLaughlin Mine, 1980-1994"
Parker, Ronald, "Resident Manager of the McLaughlin Mine, 1988-1994"
Stoehr, Richard, "Homestake Engineer and Geologist to Senior Vice President and Director"
Strapko, Joseph, "Exploration Geologist, McLaughlin Mine Discovery, 1978"

Knoxville/McLaughlin Interviews in Process:

Krauss, Raymond, "Environmental Manager, McLaughlin Mine"
Scribner, Peter, "Knoxville Mine, 1941-1944"
Thompson, Jack, "General Manager, McLaughlin Mine, 1981-1988"
Thompson, Twyla, "County Supervisor, Yolo County"
Tindell, Avery, "Capay Valley Environmentalist"
Turney, John, "McLaughlin Metallurgist: Pioneering Autoclaving for Gold"
Underwood, Della, "Knoxville Rancher, McLaughlin Mine Surveyor"
Wilcox, Walter, "County Supervisor, Lake County"

PROJECT HISTORY--Knoxville District/McLaughlin Mine Oral History Project

The development of the McLaughlin gold mine in the Knoxville District of Napa, Lake, and Yolo Counties in California in the last quarter of the twentieth century was a historically significant event. The mines of the district had been major producers of mercury since 1861. In 1888 an official report by G. F. Becker on the quicksilver deposits mentioned the presence of free gold which could be obtained by panning. It took almost a century before this knowledge could be acted upon when Homestake Mining Company signed an agreement with James William Wilder, owner of the Manhattan Mine, in 1978.

Advisors to the oral history series on Western Mining in the Twentieth Century who were also Homestake directors, Professor Douglas Fuerstenau, principal faculty advisor, Clifford Heimbucher, and John Kiely, all urged the Knoxville/McLaughlin oral history project, as did advisor Sylvia McLaughlin, widow of the Homestake chairman for whom the mine was named. It was decided it should be a community oral history, in contrast to the previous volumes in the series which documented individual careers.

The five historically important aspects are: the history of the Knoxville mercury mining district, with its periodic booms and busts; the effects of a large industrial development and influx of technically trained workers in an economically depressed rural area; the efforts to obtain permits to develop a mine near a center of environmental activism; the continuous pressure oxidation system which was pioneered at the McLaughlin processing plant; the reclamation of the mine site. The life of the McLaughlin mine was projected to be about twenty years, and most of the key players were available for interviews. It is a nearly unique opportunity to document the discovery, development, and closing down of a mine while it is happening.

The chronology of the McLaughlin Mine is as follows: in 1961, following publication of a Professional Paper by USGS geologist Ralph J. Roberts, Newmont geologists John S. Livermore and J. Alan Coope found a major deposit of micron-sized gold on the Carlin trend in Nevada. It was economic to mine because of technological advances in explosives and earth-moving equipment, and development of new methods such as heap-leaching for recovery of gold from ore. This led other mining companies to search for similar deposits of "invisible" gold.

In 1969, the National Environmental Protection Act was passed, followed in 1970 by the California Environmental Quality Act.

In the 1970s, "Bill" Wilder, principal of the One Shot Mining Company, was reclaiming batteries for Mallory Company in the furnaces at the Manhattan mercury mine. Environmental concerns had made mercury

mining unprofitable, so Wilder was crushing the beautiful colored rock on his property and selling it as decorative stone. An assay from several years before had showed gold was there, but at that time mercury at \$75 a flask was more valuable than gold at \$35 an ounce, the official price from January 1934, when the United States went off the gold standard, until 15 March 1968.

In August 1971, President Richard Nixon terminated the convertibility of the dollar into gold, and the price climbed to \$700 an ounce in 1980. In 1977, Homestake Mining Company underwent a restructuring and embarked on a program to find a world-class gold mine. Their search revealed geology reports in their files from the 1920s which encouraged exploration at hot springs near the Knoxville mercury mining district of northern California. In 1978 Donald Gustafson, Homestake geologist, visited the Manhattan Mine at the place where Napa, Yolo, and Lake Counties meet.

The history of the Knoxville District begins in 1861 with the incorporation of the Redington quicksilver mine, also known as the XLCR or Knoxville mine, then employing as many as 300 men. The town of Knoxville had thirty or more buildings, including a store, hotel, postoffice, Wells Fargo office, school, and cemetery. In 1872 the state legislature transferred prosperous Knoxville Township from Lake County to Napa County, although it is separated from the Napa Valley by mountain escarpments. Lake County was compensated with a one-time payment of \$3500.

In 1869 R. F. Knox and Joseph Osborn opened the Manhattan Mine on the same lode as the Redington. The Oat Hill or Napa Consolidated Mine was opened in 1872. A report on the metallurgy of quicksilver issued by the Department of the Interior in 1925 says, "In 1874, the Knox continuous shaft-furnace for the treatment of both fine and coarse ores was first used in California." [Bulletin 222, p.5] The Knox-Osborn design was further augmented by a fine-ore natural-draft furnace developed by mine superintendent Charles Livermore. The district prospered until 1905, for a decade around World War I, and from 1927-1936. Demand for mercury rose during wartime because it was used as a detonator for explosives.

Knoxville was linked by road through Sulphur Canyon with the town of Monticello in fertile Berryessa Valley. Farmers descended from early Scots settlers grew pears, prunes, wheat, and barley and occasionally worked in the mercury mines. After World War II, when California's population was growing rapidly, a dam was built which by 1956 flooded the valley to create Lake Berryessa. It attracted vacationers, and for most of them it was the end of the line. The unpaved road from Lake Berryessa to Knoxville was impassable when rains filled the creek bed. In the other direction, from Knoxville to Clearlake, there was a similar little-used road through Morgan Valley.

Although it is only a few miles from the densely populated San Francisco Bay Area, in 1978 Knoxville township had few telephones, surfaced roads, or bridges. Populated by ranchers, miners, seasonal hunters, and outlaws, it was one of the most economically depressed regions in California, with high unemployment. In 1991, Napa historian Robert McKenzie called it "truly the last frontier of Napa County."

Mining companies are familiar with developing mines in remote and rugged locations, with the attendant logistical problems. In this case, there was the further challenge of obtaining permits to develop a mine in the jurisdiction of three counties, regional and state water quality districts, three regional air quality districts, various state agencies, and the Bureau of Land Management. It took more than five years and cost millions of dollars to secure the 327 required permits which made a stack of paper more than eight feet high. In addition, the ore itself was finely disseminated, fairly low grade, and as it turned out, highly refractory. Traditional methods of beneficiation were ruled out by environmental concerns, so Homestake metallurgists developed a high pressure oxidation system, incorporating technology from South Africa, Germany, Canada, and Finland, which has now been widely copied.

The eventual design was for a mine pit with adjacent crushing plant and a five-mile pipeline to conduct slurry to a zero-discharge processing plant using a variety of technologies, including autoclaves. Reclamation in the mine and on dumps began almost immediately, and at the end of the mine's life, it was to be a part of the Nature Reserve system of the University of California, for research by scholars at both the Berkeley and Davis campuses.

In 1991, the Regional Oral History Office began to explore possibilities for funding the Knoxville/McLaughlin oral history. A four-year project was outlined to include about thirty-five interviews averaging three hours each, for a total cost of \$100,000. The initial plan was to schedule and begin interviews with key Homestake and community personnel in the first year, and to transcribe and edit these interviews concurrently with continuing interviews through the second and third years. The fourth year would be devoted to the final editing tasks. The product would be a set of three volumes covering the mercury mining, the gold mining, and the resulting changes in the surrounding community.

The Hearst Foundation granted \$20,000 to document the gold mine, and the Mining and Metallurgical Society of America gave \$6,000 to document the earlier mercury mining. Homestake and Chemical Lime Company each donated \$2,000, which enabled interviewing to begin in March, 1993. As the project went on, other organizations and individuals joined in the funding effort. They are all listed on the donor page.

The best laid plans, however, can be spoiled by circumstances beyond control. One of the first names on the list of interviewees was John Ransone, Homestake's construction project director. He sent helpful background documents in preparation for a scheduled interview; however, before it could be held he died of lung cancer. The project manager for the construction company, Klaus Thiel, in the meantime had been assigned to work in Brisbane, Australia, so he could not be interviewed. Several of the other Homestake people had scattered: James Anderson to Denver, Jack Thompson and John Turney to British Columbia, David Crouch to Salt Lake City, Donald Gustafson to jobs in Namibia and Kazakhstan, Joseph Strapko to Maine. William Humphrey and Richard Stoehr both underwent major surgery.

Similar problems occurred on the list of community leaders. Some died and others moved away. All of this led to a revised plan to use the available funding to press ahead with recording all the interviews, and to leave the processing of the tapes for later.

There is a perception that the former mercury miners are all dead, killed by mercury poisoning. In fact, Dean Enderlin, a geologist at the McLaughlin Mine and also a Napa County native and historian, helped to locate some who were remarkably healthy, and who were interviewed. Elmer Enderlin in his eighties spends summers working at his tungsten prospect in Idaho and winters in Lower Lake. Anthony Cerar, also in his eighties, actively maintains several historic mercury mines, including La Joya and Corona. William Kritikos, operator of the Oat Hill Mine, was nearly seventy-three when he died following a stroke, but was in good health at the time of his interview. Ed McGinnis, who worked around the Reed Mine as a boy, is still active in his seventies. Bill Wilder, who owned the Manhattan Mine, is a relative youngster in his seventies and in good health in Upper Lake.

By 1998 a number of members of the local communities had been interviewed: a county supervisor from each of the three counties involved, Napa County planners, the Lake County school superintendent, community historians and pioneers, merchants, and ranchers. Some of the most vocal opponents of the mine were also interviewed. Interviews were conducted with many of the Homestake officials and employees involved in key roles in the discovery and development of the mine. The project comprises forty-three interviews in all.

Two of the interviews were completed in 1996: William Humphrey, who was Homestake's executive vice president of operations in charge of the mine development, and William Wilder, owner of the Manhattan Mine. The oral history of Langan Swent completed in 1995 also contains relevant information.

We are grateful to all of the interviewees for their participation. There are many others who have helped also. Homestake Mining Company has

cooperated with the project, lending the Regional Oral History Office a computer and printer, and making available for research the archival video tapes and files of newspaper clippings and news releases, as well as the environmental studies, the environmental impact report, and the environmental impact statement. Early on, a day tour of the property and box lunch were provided for a van load of ROHO staff, interested students, and faculty from the University of California at Berkeley. The conference room at the mine and the San Francisco offices at 650 California Street have been used for interviewing.

James Jensen made available his extensive files on mercury mining and processing and mercury poisoning. Anthony Cerar led a vigorous hike around the Knoxville mine site, identifying foundations of long-gone buildings and workings. John Livermore conducted a tour by jeep of the Knoxville district, and suggested the importance of the Morgan North papers at The Bancroft Library. Staff members gave help at the Napa Register, the Napa Museum, and the Sharpsteen Museum in Calistoga. At the Lake County Museums in Lower Lake and Lakeport, Donna Howard and Linda Lake were particularly helpful. Ron Churchill, Ralph Loyd, Kathleen Twomey, and Les Youngs provided useful data from files of the California Department of Conservation Division of Mines and Geology.

The Regional Oral History Office was established in 1954 to augment through tape-recorded memoirs the Library's materials on the history of California and the West. Copies of all interviews are available for research use in The Bancroft Library and in the UCLA Department of Special Collections. The office is under the direction of Willa K. Baum, Division Head, and the administrative direction of Charles B. Faulhaber, James D. Hart Director of The Bancroft Library, University of California, Berkeley.

Eleanor Swent, Project Director
Knoxville District/McLaughlin Mine
Oral History Project

January 1998
Regional Oral History Office
The Bancroft Library
University of California, Berkeley

INTRODUCTION by John S. Livermore

I have known Hugh since the 1960s when he was living in Middletown, California, near our family ranch. During this period the price of mercury had risen and there was a lot of activity in reopening old mercury mines in California. As a mining engineer, Hugh did consulting work for various groups to help them in that effort. However, he always returned to his real love as an independent entrepreneur, representing the best qualities of individual initiative.

Hugh became interested in the Corona Mine that adjoined our ranch. It was an old producer in the 1896-1910 era that he thought had potential. He leased the property as well as part of our ranch property. It was here that I gained my initial respect for Hugh's character and work ethic.

Hugh and his son Hughie constructed almost singlehandedly a plant for roasting the ore that consisted of a crusher, rotary kiln, and condensing system. This fairly simple recovery method resulted in the production of pure mercury by condensing the volatilized gas produced by heating the ore. They also constructed living facilities adjacent to the furnace. This is ironic when one considers the overstated fears of the dangers of mercury in our modern economy. The metallic or inorganic mercury is not the dangerous form. It is only when it is converted to organic mercury in streams that it enters the food chain and is a health problem. They must have been breathing a certain amount of the gas, but it didn't seem to affect their health.

The Corona Mine was operated profitably for two to three years by Hugh, his wife Janet, and son Hughie until the mercury market dropped precipitously and Hugh had to abandon it.

He moved his family to Yerington, Nevada, in 1970 and was involved in a number of mining activities. He always had a mine he was working on his own, but when his cash ran low he would work as a consultant for a period of time. He and Hughie did various jobs in the seventies and eighties for Cordex Exploration Company, which I managed. This included opening up old mine workings and organizing sampling programs. His work was always of the highest quality and I had complete confidence in his conclusions as everything was done with meticulous attention to detail. He represented the highest standards of his profession as a mining engineer.

I followed Hugh's independent activities in Nevada with interest. He and his son Hughie operated together as a team, usually without outside help and with limited resources. He worked in a number of old mines after following up on a story that good ore had been left by the

old timers. All this required a lot of heavy, hard work clearing out caves and retimbering old shafts and adits.

They built several gold plants for treating old dumps and workings that they had opened up. Of all the people I know who deserved to make a "strike" it was the Ingles, but the supposed treasure always seemed to be just out of their grasp, and Hugh and Hughie never got into anything that was as profitable as the Corona.

We had a close personal relationship and would have long political discussions. Although not always in agreement, I admired his strong beliefs. Hugh was a true conservative and a great patriot. He was a strong supporter of national defense as a result of his experience as a pilot in the navy, and felt strongly that the government was not sufficiently supportive of our armed forces. He was a valiant advocate of private rights and railed against the increasing government regulation that made it very difficult for a small miner to operate. But in spite of this he didn't lose his optimism and kept forging ahead on his mining efforts.

Hugh was one of the last of a breed of small miners--a throwback to the days when there was a number of "leasers" working in many small mines. They would often be supplied by the owner or a backer with supplies, powder, and drills, and would only have to furnish their labor. The income from production would be split 50-50, and some of the leasers did very well. Nowadays there are very few young people who are willing to take on the hard labor and risk involved in this work.

Hugh became an articulate advocate for the mining industry, and the small mines in particular. He was president of the Nevada Miners and Prospectors and held this organization together for many years. He was often called on to testify before various state and federal legislative committees representing the interests of small miners. The most recent occasion was to appear before a committee established by the National Academy of Sciences to investigate the efficacy of the regulations established by the Bureau of Land Management to control the use of public land by the mining industry.

He had serious health problems in the later years of his life, but with his usual fortitude he fought the disease through many treatments and ups and downs. He would never give up and was working his Mabel mine the day before he died.

I don't know anyone I admire more than Hugh for his honesty, character, dedication to the principle of entrepreneurship, and concern for the state of our nation.

John S. Livermore
Partner, Cordilleran Exploration Company;
President, Public Resource Associates

March 2000

INTERVIEW HISTORY--Hugh C. Ingle, Jr.

Hugh C. Ingle, Jr., was well known as an operator of small mines in northern California before he moved to Nevada in the late 1970s to take over the Ashby Mine. At the time of his death in October 1999, he was Commissioner of the State of Nevada Commission on Mineral Resources, appointed in 1991 to represent small-scale mining and prospecting. He was also president of the Nevada Miners and Prospectors Association. Fortunately for the Knoxville District/McLaughlin Mine oral history project, in the late 1990s he returned to the Corona Mine as contractor for reclamation, and was available for interviewing. His oral history is valuable as an articulate exemplification of several contemporary trends in mining in the late twentieth century: the decline of independent small mines operation, the demise of mercury mining, the shift in activity from California to Nevada, and the emphasis on environmental protection and minesite reclamation.

I had seen Hugh Ingle's name in the literature of the Mayacmas-Knoxville area, but did not meet him until September 1998 when I visited the Corona Mine, located at the head of a steep and narrow canyon overlooking Pope Valley in Napa County. There was a Scott furnace in quite good condition, and at that time there were still a number of other relics of buildings and equipment from earlier operations. Hugh and his son "Hughie" were hard at work installing a near-vertical tramway track down to a lower mine adit. We talked then about the possibility of an interview. Hugh was a willing interviewee, but also a very dedicated worker, so it was not easy to arrange a time when he could spare hours for talking about his wide-ranging career. He and Hughie came from their Yerington, Nevada, home when weather allowed work at the Corona, and were at the mine by first light each morning. At the end of the day, by the time they drove to Middletown for dinner and returned to their friend's home on Butts Canyon Road for the night, it was very late and they were exhausted. When they took an infrequent day off, it was to procure equipment or supplies, or because the weather was bad, and they went home to Yerington.

The invitation letter was sent in September 1998 and promptly accepted. The first interview was held on 6 November 1998 at the Corona. Andrew Johnston, a Ph.D. candidate in architecture at the University of California, Berkeley, who was doing research on old mercury mine sites, accompanied me and participated briefly in the interview; he was knowledgeable about recovery methods when the Scott furnace had operated.

Recording conditions were far from good, but I was glad to have Hugh walk with me around the site, recalling what facilities had been there, and to catch the flavor of his work. There were showers during

the day, so we sat in his truck at times. Hughie was working far below us and communicating with his father on a two-way radio. Hugh operated the hoist when requested; in between times, he was free to talk, although remaining attentive to calls from below. He and his son had an uncommonly close and affectionate relationship, having worked together for most of forty years. Their only ill temper was directed at federal regulators, and this was not paranoid, but warranted; they are probably being put out of business by some of the regulations. Hugh at this time appeared robust, although I knew he had endured cancer treatment, and had some heart problems.

The second and third interviews were held the following spring, on 5 and 6 April 1999, at the Ingle home in Yerington. I flew to Reno, rented a car, and drove through the fertile Mason Valley on a beautiful spring day. I saw the Anaconda property described by Vincent Perry in his oral history, and recalled his account of farmers welcoming the water from the mine as they used it for irrigation.

The Ingle home stands on a bench above the valley floor on the west side so they have a fine view of snow-covered Mt. Grant to the east. Janet Ingle's doll collection, paintings by Hugh's relatives, and family photos add to the warmth and welcoming feeling of the devoutly Christian home. I had previously noted at a restaurant in Middletown that both men bowed their heads for a quiet and unobtrusive blessing before eating.

Hugh's office, attached to the house, is businesslike, filled to capacity with maps, drawings, files, desk, and work table, all orderly and clearly in active use. That night there was a heavy snowfall, and in the morning Hugh drove to the motel to escort me to the interview, since my rental car was an unknown entity under such conditions. It was a typically considerate gesture. In these interviews, he reviewed his childhood, working from the age of ten with his father in "pocket" mines, hunting deer for food and even retrieving gold nuggets from the craws of birds. He says, "It was a rewarding life....I've loved it ever since." He studied at the Mackay School of Mines in Reno to be a "desert rat," and worked at times for larger enterprises, including the U.S. Bureau of Mines, but was always happiest working for himself. He worked for a number of mines in the Southwest and took consulting jobs in the Congo, Brazil, and Mexico. There was also a forty-year career as a U.S. Navy fighter pilot: shot down over Korea and surviving miraculously, and continuing to serve as a reserve pilot. And there is the parallel thread of mining as a family affair: Janet working at the hoeing table, and the sons with their father.

When the interview process was complete, the tapes were transcribed in the Regional Oral History Office, lightly edited, and the transcript was sent to Hugh Ingle for review. He made a few minor clarifications of diction and returned the transcript promptly, with

some factual additions and a cover letter saying his latest medical checkup gave him confidence. Only a few days later, however, Hughie called to report his father's death on 16 October. Our sorrow at completing the volume posthumously is tempered by gratitude that we were able to record the recollections of this significant career. The interview transcripts were corrected, amended, and indexed at our office. The tapes are deposited in The Bancroft Library and are available for study.

Geologist John Livermore, present owner of the Corona Mine and longtime friend and colleague of Hugh Ingle, facilitated the interviews and supplied the introduction to the oral history.

The Hugh C. Ingle, Jr., interview is one of more than forty interviews which were conducted by the Regional Oral History Office from 1993-1999 in order to document the development of the McLaughlin gold mine in the Knoxville District of Lake, Napa, and Yolo Counties, California, from 1978-1999, as part of the ongoing oral history series devoted to Western Mining in the Twentieth Century. The Regional Oral History Office was established in 1954 to record the lives of persons who have contributed significantly to the history of California and the West. The office is a division of The Bancroft Library and is under the direction of Willa K. Baum.

Eleanor Swent, Senior Editor
Regional Oral History Office

The Bancroft Library
University of California, Berkeley
May 1999

Regional Oral History Office
Room 486 The Bancroft Library

University of California
Berkeley, California 94720

BIOGRAPHICAL INFORMATION

(Please write clearly. Use black ink.)

Your full name Hugh Cochrane Ingle, Jr.

Date of birth August 17, 1923 Birthplace Santa Rosa, California

Father's full name Hugh Cochrane Ingle

Occupation Civil and Mining Engineer Birthplace Indiana

Mother's full name Edith Kissam (Young) Ingle

Occupation Journalist Birthplace New York City, New York

Your spouse Janet Lucille (Latta) Ingle

Occupation Housewife and Mother Birthplace Davison, Michigan

Your children Joyce Lynn (Ingle) Hakin, 51; June Kthleen (Ingle) Corbit, 48;
Hugh Calvin Ingle, 47; Richard Moris Ingle, 44.

Where did you grow up? California and Oregon

Present community Yerington, Nevada

Education Assoc. of Arts, Santa Rosa Junior College, 1942; University of
Nevada, Mackay School of Mines, B.S. Mining Engineering 1948

Occupation(s) Consulting Mining Engineer; Mine Operator

Areas of expertise Hardrock & Placer Mining, Surface & Underground; Milling
of many kinds.

c

Other interests or activities The changing piture of government regulations;
flying; prospecting.

Organizations in which you are active Member, Commission on Mineral Resoures,
Nevada; President, Nevada Miners & Prospectors; Member Lyon County Public Lands Commission; SME;

Mason Valley News,
October 22, 1999

Hugh C. Ingle, Jr.

Hugh C. Ingle Jr., 76 was born August 17, 1923. He died October 16, 1999 at his home in Yerington.

He was born in Santa Rosa, CA at Sonoma Co. Hospital to Hugh Cochran Sr. and Edith (Young) Ingle and had lived in Yerington for the past 19 years, coming from Middletown, CA. He graduated from Anahy High in Sebastopol, Santa Rosa Junior College, and Mackay School of Mines Reno, NV as a mining engineer.

He was an outspoken adherent for mining, small and large, working in and for the industry for 66 years.

He served his country in WWII and Korea, as a fighter pilot, staying in the Naval Reserve for 40+ years retiring at the rank of Navy Captain.

He was a devout Christian man whose commitment to Christ was without reservation and apparent to all who knew him well.

He is survived by the love of his youth, his wife of 53 yrs., Janet. His son and mining partner for 42 yrs., Hugh both of Yerington; his daughter June and her husband Larry Corbit of Minden; his daughter Joyce Lynn and

her husband Carl Hakin of Yerington; and his son Dick and his wife Cathy of Polson, MT. He is also survived by 10 grandchildren.

He was a loving father, a good husband, and a faithful friend. He is much loved and will be sorely missed.

Services will be held, October 22, (today) 10:30 a.m. at Smith Valley Community Methodist Church on Rivers Rd. Burial will follow at the Hillcrest Cemetery in Smith Valley.

HUGH C. INGLE, JR.

Hugh C. Ingle, Jr. was born in Santa Rosa, CA on Aug. 17, 1923. His first experience in mining came in 1933 at a small, underground-pocket gold property in southern Oregon being worked by his father. He was handed a lard bucket with a candle in it, a pick, a shovel, a steel-tired wheelbarrow and was sent to advance a heading. He worked succeeding summers in placer- and hard-rock mines. These experiences gave rise to a lifelong love for mining.

In 1940, Ingle began his college education at Santa Rosa Junior College and received an Associate of Arts degree in engineering. He enrolled in the University of Nevada-Reno Mackay School of Mines in 1942 and was a member of the Naval Aviation Cadet program. He was ordered to active duty in 1943, commissioned as an ensign and assigned as a carrier-based fighter pilot. After three-and-a-half years of military service, Ingle returned to the Mackay School of Mines in 1947. He graduated with a

B.S. in mining engineering in 1948.

After graduation, Ingle leased an underground antimony mine near Jacksonville, OR until the market failed. He then went to work as a field engineer for Bolo Mining in an open-pit gold mine near Placerville, CA. In July 1950, he was recalled to active duty as a member of the Naval Air Reserve for service in the Korean conflict. His aircraft was shot down and crashed into enemy troop concentrations. This resulted in two purple hearts and numerous other citations. He remained in the Naval Air Reserve until 1983 and retired as a Navy captain.

Ingle resumed his mining career in 1952 as general superintendent of Teekay Mines in Tracy, CA. Teekay was a small, underground battery and metallurgical-grade manganese mine and gravity magnetic mill. He then served with Mojave Mining and Milling as mill superintendent and mining engineer at its Deming, NM and Wickenburg, AZ operations. Fol-

lowing the termination of the government purchase program, he worked for Natomas on magnetite in Arizona and Union Carbide Ore in Africa, Brazil and Mexico. He evaluated operations for tantalum and mercury.

Ingle (Continued on page 72)

NECROLOGY

| date elected | name city, state |
|-----------------|--|
| 1957 | Thomas J. Ferree Lakewood, CO |
| 1923 | C.T. Hayden ** Chicago, IL |
| 1947 | Hugh C. Ingle, Jr. ** Yerington, NV |
| 1957 | John M. Penick Columbia, MO |
| 1987 | John C. Rebenstorf Patton, CA |
| 1937 | W.E. Snow ** Miami, FL |
| 1971 | J. Gordon Strasser Toronto, ON Canada |

** Denotes Legion of Honor

MINING ENGINEERING ■ DECEMBER 1999 67

Ingle (Continued from page 67)

In 1962, Ingle became a mining consultant specializing in small, underground properties and millworks. He worked for numerous companies. These included American Exploration and Mining, Pennzoil, Almaden Property Holders, the Helen Mine, Powerine Oil, McIntyre Mines, Nerco, Cordex Exploration, CoCa Mines and Cactus Gold Mines.

From 1972 to 1974, Ingle consulted for FMC. He designed safer coal mining machines and

created mine plans to use the equipment. While carrying on his consulting work, Ingle and his two sons designed and built a small mercury-furnacing plant. They operated it until the collapse of the mercury market. Ingle and his older son built a gravity-flotation plant to handle custom ore and ore from the three, small underground mines they developed near Hawthorne, NV. They also redesigned and built three portable mercury retorts, two for Nevada operators

and one for use in Peru.

Ingle was appointed to the State of Nevada Commission on Mineral Resources in 1991 to represent small-scale mining and prospecting. He was an effective voice for the small miner and testified many times before the Nevada Legislature and in other public forums. He was a lifelong member of the Nevada Miners and Prospectors Association and was its president at the time of his death, Oct. 16, 1999. ■

I OPERATING THE CORONA MINE FROM 1955 TO 1970

[Interview 1: November 6, 1998] ##¹

Intriguing Because of Metallurgical Problems

Swent: We're out at the Corona Mine in Napa County, and this is November 6, 1998. Normally, we would start with more background on your life, but we're going to take advantage of the chance here to just talk mostly today about the Corona Mine. Hugh, just tell me when you first started working at the Corona.

Ingle: I think it was 1955 that I first read about it. A friend of mine --a friend of his had bought a ranch up here. There was supposed to be an old mercury mine, and he didn't know what the name was, so I started reading one of the California publications and read about the Corona, and it intrigued me.

Swent: Where did you read about it?

Ingle: I can't remember the number of the publication, but it was a California Bureau of Mines. They used to do real well on describing the mines, at least what was reported to be in them. I had always figured that if you wanted to find a mine that had maybe some easily-accessible ore, it had to have a problem of some kind--either market or metallurgy or mining, something of that nature. So the Corona fit the bill because they had had a metallurgical problem in the past, and I guess nobody had made any money. So it was intriguing that way.

Swent: So your friend had a ranch near here?

Ingle: Yes. And I can't remember where it was, but I think it was near Calistoga.

¹##This symbol indicates that a tape or tape segment has begun or ended. A guide to the tapes follows the transcript.

Swent: I see. This mine was not on the ranch property.

Ingle: Oh, no, no. But I just tried to figure out which mine it might be, and so I read the whole book, and this one really intrigued me. So I started in 1955. I got some leases from Livermores and from the Vallejo Quicksilver.

Swent: Did they own it at that time?

Ingle: Vallejo Quicksilver Mining Company owned it. I think John got it from them.

Swent: John Livermore, that is.

Ingle: Yes. Well--yes, he got it from--Don Emerson was the one I usually dealt with, although I met all the members of the Vallejo Quicksilver Mining Company. His mother had something to do with--the McCaulleys. So anyway, at first I was working for a small mining company, the Taylor-Knapp Company. We had a mill and a mine for battery-grade manganese in Tracy, California. That shut down because of metallurgical problems, grinding problems. I ran their lab for about a year, their metallurgical lab, and I started coming up here and doing a lot of hand work. They took an interest and so they made a deal with me on a partnership.

Partnership with Taylor-Knapp

Swent: Taylor-Knapp, that is.

Ingle: Yes. Al Taylor was the geologist and the real driving force in the company.

Swent: Was that the Al Taylor that later worked for Bechtel?

Ingle: No, no. The Altoona, you say?

Swent: Al Taylor.

Ingle: Oh, Al Taylor. No, I don't think he did. He worked for Anaconda, and he was quite a geologist. He set up their geology department in Chuquicamata, Chile, and then I think he was--Park City, Utah, that--anyway, one of the big mines over there. And he set up the geology there. He taught me a lot, too. He was pretty old. While he was up here on one of his visits, we opened the portal. I guess they call it Number Three. Anyway, it was the one below that little open pit up there. So we got that opened, and then he

had a heart attack while he was here. He survived it, but--San Knapp was his partner. He was a mining engineer, and Al was a geologist.

Swent: San?

Ingle: Yes. His name was Sanford, I think, really. And then they had a third partner that was a lawyer in Montana, where they had another battery-grade operation. Actually, the only two sources of battery-grade manganese in the U.S. at that time--one was at Tracy, and they opened that up while I was in Korea. Then they had a Philipsburg operation in Montana. Al was real interested in this, and the chief engineer was a real fine fellow named "Chid" Knaebel.

Swent: Chid?

Ingle: Chid, yes. They called him Chid, and I don't remember what his real name was. He was interested in it, but San wasn't. He figured they could invest more money in Philipsburg, and so I didn't argue with him. I just figured, Well, I guess that's it.

Swent: So you had the lease in your own name, then.

Ingle: Oh, yes, because I hadn't figured on them coming in. I figured to try to some way or another poor-boy it. Anyway, I did a lot of consulting work. I did some work in Arizona, and I kept up the lease or the leases.

Swent: You had your home in Middletown at this time, did you?

Ingle: No, no. My home was in Tracy, and then because we needed beans, why, I took a job in Arizona in manganese and eventually wound up with Mojave Mining and Milling Company, which was the biggest carlot shipper of metallurgical-grade manganese.

Swent: But all the time you held the lease here on the Corona.

Ingle: Yes. I paid--I can't remember. It wasn't too much. But I paid, and then when I could, I could do work in lieu of payments. Let's see. We were in Arizona I think probably until 1960, and then Bill Kritikos wanted some help up here.

Swent: He had the Oat Hill.

Ingle: He had the Oat Hill and was running the dumps. So I came up and started work for him. It turned out it was a dry year [laughs]. There was hardly any water, so it didn't work too good.

Swent: This is about 1960?

Ingle: Yes. And then I went to work at the Reed Mine because there was too little water, and we couldn't really keep going. Fran Frederick called me for that job.

Swent: I think maybe your helpers are coming.

Ingle: Shut it off, and I'll tell them.

Swent: All right.

[tape interruption]

Swent: Okay, we're continuing after a little bit of an interruption here. So in 1960, then, you went to the Reed and then you came back here. We'll talk about the Reed another day.

Ingle: Okay.

Swent: So you came over here.

Ingle: Yes, I came over here to the Corona. While I was working for Bill, in my spare time I came to the Corona. Then we got a little money together, and I got a little help from my dad, and we got this little rotary furnace.

Bringing the Furnace from Wilbur Springs

Swent: Where did you get that from?

Ingle: We got it from Wilbur Springs, just above the old ranch house. To get it down the hill, we put a rolling hitch on each end and used Bill Kritikos's weapons carrier and mine, with the winches on the front, and we let it down the hill real slow and onto a flatbed truck that we hired and that was parked at the bottom. He was fairly bold because if we had lost it, he'd have lost his truck.

Swent: Tell about what does the furnace look like? How big is it, and how much does it weigh?

Ingle: Oh, let me see. I guess we can measure it because I'm not sure of the length. It's twenty-four-inch--or is it thirty-inch? No, we better check it.

Swent: Anyway, it's a pretty big thing to drag all the way from Wilbur Springs.

Ingle: Oh, oh, yes, yes. And then we brought the discharge hopper for it, which was of course brick-lined. And then we got the hot rock bin that's under the end of the furnace--we got that from the Twin Peaks over here. The first condenser system was with the furnace, but with the acidic nature of the ore, why, the first condensers went out--well, I put sprays in because it was too short a system, and the sprays cut through the big condensers in about a day.

Swent: Oh!

Ingle: And so anyway, we were kind of stymied.

Swent: And you were coming over roads that weren't very good, either.

Ingle: Well, that's true. In fact, when we first started, when the foreman from Taylor-Knapp first came up with me, we had the weapons carrier and had the winch on the front, and the little bridge down here was not in, and we had to take the upper road, and we had to hook a cable on the winch twice to pull us in and twice to pull us out in the evening because the mud was about axle deep, and even with four-wheel drive we couldn't get through it. So we had quite a struggle. Of course, we were doing everything by hand. We did get that level below the little open pit--we got that opened.

I had gotten in there once when it was raining. The chief geologist for--oh, for one of the copper mines over at Ely [Nevada], and he was with me, and there were two big boulders lying above the hole that we went down, and we weren't sure whether they were going to come down or not. We got down into the mine. We shinnied down an old air pipe, and finally got into the main stope on that level up there. We were standing there, talking about it, and we heard this big collapse of something, and we weren't sure whether it was one of those boulders over the hole [chuckles], so we got out. Then we did get into there through the adit.

Opening Up the Old Mine Workings

Swent: The mine had been operating for--it was an old mine--

Ingle: Right.

Swent: --that had caved in?

Ingle: Well, you couldn't get into it. The only way we did--he kind of liked prowling around, so he said--it was raining and we had that one opening up there at the back of the little pit, and he said, "Well, do you want to go in?" I said, "Well, okay. We might as well try." So we did. We worked our way down and got into that stope, which was pretty good size for a small mercury mine.

Swent: What do you mean by pretty good size?

Ingle: Oh, I would guess--it was flat-lying pretty much. It was probably twenty feet high and maybe fifty feet in diameter, something like that.

Swent: Pretty big.

Ingle: When we finally got to operating the mine, we started in one part of that stope. There was a chute in a short drift. We had some indications up above that we thought the structure would give us some more pretty close by, so that's where we first started. We cross-cut from that short little tunnel and went--I've forgotten how far it was, but these two lessees--we thought we were going to have contact in about twenty feet. Instead of that, the contact took a roll, and we went probably about eighty feet, something like that, before we got it. And then it was on that structure, though, that we got our largest stope while we were mining.

Swent: How were you mining? What sort of equipment and so on were you using?

Ingle: We had a big Atlas-Copco jack drill, and we had a rented compressor. In fact, we rented one from Kritikos in the beginning. We had a slusher that we brought from Arizona, and we used that. And of course we had some mine cars, and so we loaded --built a ramp--

Swent: Where did you get the mine cars?

Ingle: We got them in Arizona also.

Swent: Hauled them up on trucks?

Ingle: Yes. In fact, the Taylor-Knapp Company sold Bill some equipment. I knew Bill at that time--I had already met him up there.

Swent: Bill Kritikos.

Ingle: Yes. And so when Mojave Mining and Milling liquidated, he bought some equipment from them. I let him know what they had, so we brought a truck and trailer up. We had our stuff aboard, too.

Atlas-Copco Drills

Swent: The Atlas-Copco drills: what were they like?

Ingle: Well, it's right over here.

Swent: They were a pretty exciting development in drilling at that time.

Ingle: Oh, yes. You bet, you bet. They had the first jack drills, and they were small. This one [demonstrating] is a larger one. We've got a small one, too. But it was quite an innovation because before that I think most of the work was done with columns and bars, and the drills were mounted on these things. With a jack drill, you could move it around easily. But some of the bars and the columns were pretty heavy.

Swent: What kind of bits did they have?

Ingle: Well, Atlas-Copco had integral bits, a chisel bit.

Swent: That was sort of new, too, wasn't it?

Ingle: Yes, that's right. It was. And the longhole steel was fairly new at that time. That proved to be--we used it a lot for exploration.

Swent: Yes, there were some things that made it easier at that time.

Ingle: You bet, you bet.

Swent: You mentioned the metallurgical problems, and we'll talk about those, I guess, when we get up there--how you solved those. Or do you want to talk about that now?

Ingle: Whichever you want.

Solving the Metallurgical Problems

Swent: Well, let's mention it now.

Ingle: Well, the metallurgical problem. We had been told by several of the old-timers that the ore was pretty tough to handle, that you had to retort the ore or, if you had soot from a furnace, you had to retort it about two or three times to get the mercury to come out. I kind of thought it was a little bit of an old wives' tale. We got some ore out from the little open pit, and we retorted it--

Swent: Here?

Ingle: Over at Oat Hill. We used their retort, and we couldn't get any mercury to come out.

Swent: I think you said you didn't want to heat that retort up too much?

Ingle: Yes.

Swent: What kind was it?

Ingle: It was a Pacific Foundry D, as I recall. It's still there, too, I think.

Swent: A "D" retort is shaped like the letter D?

Ingle: Well, it's flat on the bottom, but it's an arched top. In fact, we've got the one up here that is a Pacific Foundry.

Swent: I guess that's why it's called a D, isn't it?

Ingle: Yes. And, of course, they had pipe retorts then, too. A lot of them were pipe retorts of various manufacturers. Sometimes they put--well, they'd put a whole row of pipe retorts in. Sometimes they had a double D--I mean, two Ds side by side in the same brickwork. But anyway, we used the one over at Oat Hill.

Swent: How much ore did you put into it?

Ingle: Oh, gee, I can't remember.

Swent: Just more or less--

Ingle: It might have held 500 to 1,000 pounds, I think. You had to mix it with lime to try to take care of some of the sulphur. Sometimes it was retorted without it, if you had clean ore. But anyway, after a couple of days, which--I mean, it should have cooked out in, oh, maybe twelve hours at the most, or twenty-four. I left it in there for, I think, three days, and we got no mercury.

Swent: What were you using for fuel?

Ingle: Let's see. That one was--I'm not sure whether it was gas-fired or oil-fired. I don't remember. Diesel-fired, it could have been.

Swent: What sort of temperature would you have been getting?

Ingle: Well, I think we started at 700 to 800 degrees Fahrenheit. On that, we didn't have any temperature gauge. We just went by the color of the D itself. When it got to just barely red, and that means you look at it at night, in the dark, to see what--

Swent: What was it made of?

Ingle: The D?

Swent: Yes.

Ingle: Cast iron.

Swent: Okay, and it was not encased in anything.

Ingle: Well, you had to have brick around it, yes. Just like the one up here.

Trying a Borrowed Pipe Retort

Swent: But you would go in in the night and look at it to see if it was red enough?

Ingle: Or you'd have to shade it some way--because you didn't want to get it too hot or you might crack it. I was pretty careful with that, and we didn't get any mercury out, and so Vince Yracibil had a little pipe retort behind his cabin. His cabin is that old one below the road over here. He had a little pipe retort behind his cabin. He wasn't using it any longer, and he didn't care what happened to it, so I decided, Well, I'll put a charge in there and I'll heat it up until it's red hot, and then I'll know that I'm not too cool, anyway.

Swent: Did you take the same charge from the Oat Hill over there, or did you start with another--

Ingle: No, we still left it in that retort. And so we put some more ore in there, and I was going out--twenty-four hours a day I was watching it--about every four hours I'd go out and check it.

Swent: Sort of like having a baby!

Ingle: Yes. And so after about two or three days with that, I thought there's something wrong. One night I was out there about two o'clock in the morning, and--the condenser pipe came out of the back of that pipe retort. I opened the door at the end of the condenser pipe, and I looked up, and there, against the red of the retort, I could see these festoons of soot hanging down. I got a scraper and scraped it out, and there was the mercury. It was fouled, but it was there.

Swent: It was there.

Ingle: And so we knew that we had some kind of a problem, so when we--

Swent: Can you guess how hot you had gotten that one?

Ingle: Beg your pardon?

Swent: How hot had you gotten that one?

Ingle: Oh, it was glowing red. I mean, it was hotter than it should have been, but I was trying to prove that there was at least some mercury in the ore. So then when we tried the rotary, when we first tried it, we had trouble with the same thing. We got very little mercury--

Swent: That's back out here.

Ingle: Yes. We got very little mercury, and we got all this soot. We tried to hoe it, and you still couldn't get mercury.

Assays Reveal Presence of Oil

Swent: To hoe it.

Ingle: Yes, it wouldn't hoe out, so--like I say, we started the furnace, my wife and I, and we had two--the coarse and the fine ore bin were full, and so we had enough for--I can't remember--maybe three or four days' run. Anyway, I took samples. We didn't get much mercury to start with, but by--I can't remember now--anyway, we took samples of the heads and the tails and that sort of thing. I got better than--well, I had it assayed with Martin Quist down in San Francisco. According to the samples, I had better than 100 percent recovery. I mean, between the tails and the heads, I didn't have the amount of mercury because it hadn't come out.

So I called him up--and I was working for Fran Frederick at the time. I was in San Francisco, and I called Martin, and I said, "There's either something wrong with my sampling or--

Uh-oh.

Swent: It's beginning to rain; maybe we should just get in the truck.

Ingle: Oh, okay.

[tape interruption]

Swent: You were talking to Martin Quist about your tests.

Ingle: Yes. So I called Martin, and I said, "There's something wrong, either with my sampling or with the assaying because I'm getting over a hundred percent recovery."

Swent: [chuckles]

Ingle: He said, "I'll check on it, then." He said, "I'll run the assays myself." So he called back next day, and he said, "Well, I see what's wrong. There's oil in the samples that you sent me," so we get false readings because the way you assay is to heat it in these little glass tubes, and the oil would foul the mercury, and so he said we had--

##

Ingle: We took the sample, and we split it and used three samples and ran them. We had something like ten pounds and twelve pounds and fourteen pounds, and he said, "We took the average" or the middle one--I can't remember which--and so he said, "That's why there's the discrepancy."

I thought, Well, we've got a dirty fire, and we're fouling up the ore.

Swent: You thought your fuel oil had gotten in?

Ingle: Yes. Anyway, then I got to thinking about it, and I thought, Well, that can't be. That was a head sample. It's got to be in the rock. When we break boulders, this water would just--what we thought was water would just come out of the boulders. It was quite extensive sometimes. So I said, It's in the head sample, so it's got to be in the ore, and that must be oil instead of water. When we fired the furnace next, I raised the temperature I think it was just about a hundred degrees. It was up to--I can't

remember. It wasn't too hot. It was 800 to 900 degrees, something like that. No problem.

The marcasite also burned. And of course, we had thought that that was a real problem.

Working with a Parallel-Flow Furnace

Swent: Was this what your ore was, marcasite?

Ingle: Well, no. There was marcasite in the ore, which is another form of--it's like pyrite only it's--I don't know exactly what the difference is--but it breaks down easier. We had quite a bit of it, and so I had thought that was the thing that was fouling it. We raised the temperature, and it was self-burning. I mean, you could look through the furnace and it was burning on its own. But that was because we fired from the head end. If we had fired from the other end, we would have just distilled it and put it over into the condensers, and we couldn't have burned it off.

Swent: I think you said that that was a unique feature of this furnace, that it burned at the front end?

Ingle: Yes. Normally, they were counter-current, and this was parallel flow. And so it worked to our advantage. We didn't have the money to try to remodel the firing and the discharge end.

Swent: So parallel flow means that the ore and the fire were moving together?

Ingle: Right. And counter-current is--

Swent: The ore goes down--

Ingle: And the fire comes up.

Swent: Why had this been built that way?

Ingle: Well, I can't tell you.

Swent: Do you think the previous people had known?

Ingle: No. I think it was a Cottrell furnace. It was set up on a framework that we could move. Somebody had stolen a couple of the trunnions when we got it, and so we got a couple of trunnions from an old furnace someplace. I can't remember. They were oversized,

but they worked fine. We didn't have any further trouble. Of course, we extended the condenser system, and we had probably four times the condensing capacity of the normal size of furnace--I mean, of this size. One reason that we got it was because we bought this stainless steel because of our experience with the iron pipes.

Constructing a Condenser System from Various Sources

Swent: You hadn't mentioned that. You talked about that before we started taping. It was so acidic, you said.

Ingle: Oh, yes. Well, we had a short condensing system to start with, and some of the old pipes--I think they were twenty inches in diameter. There was a bank of four of them. They were set in a square. I can't remember what these others are, but we had some heavier pipe that we started the condenser system with, and we had a blower which we eventually lined with stainless steel. We had a blower that we put after the first condensing system. I can't remember how many pipes were in that. But then we put a double row--well, we could count them up there, but--then we put a double row of stainless steel and the iron pipes.

The reason we did was when we bought the stainless--it was used and it was still up in the furnace--when we bought this stuff from Sulphur Bank--and that's where I met Phil Bradley--when we bought it from the Sulphur Bank, they said, "Well, take it all." So we took all the stainless steel of the smaller size, and then we took this manifold, which was probably, oh, twenty to thirty inches in diameter, but it made a good expansion chamber, and we could put both rows into it.

Then we had this wine tank that we got from some winery someplace. We got two pieces of wooden--what had been water pipe. We dug them out of the snow up at Greenville, when I was working for Placer [Company], and we brought them down here and set them on top. And so we were getting probably about 95 percent recovery, which was real good. It could have been even a little more than that, but it probably varied. But when we cleaned everything up, our total was just about that percentage.

Processing Ore from a Subdivision near New Almaden

Ingle: We didn't have any more trouble. We started running with some material that was in a subdivision just below the New Almaden Mine. They ran into some dacite dikes that had some cinnabar in them. I had been to high school with one of these developers, and so he talked to me about it.

Swent: What was his name?

Ingle: I'm not sure about his first name. His last name was Blackwell. Anyway, he said, "We've got this ore." He said, "We don't know quite what to do with it." And he said somebody down there had offered to run it for him in a furnace they had, but it would leave him no profit at all, so I told him, "Well, if you want to ship it up to us"--and the price was still over \$600, I think--

Swent: That's per flask?

Ingle: Yes. So I said, "We could try it." I gave him a price. They sent it up by slam-bang truck, and they parked the trailer down there on the county road and then put the trailer part into the truck. They would come up and dump the truck and then bring the box that was in the trailer. And so we ran that. It was pretty dusty, so we had to back off on the tonnage we could put through because if you got too much dust in the furnace, why--what it did I think was maybe rob the oxygen and so you'd get an explosion in the furnace, so we had to back down on that. But we ran it successfully and made some pretty good money, and they did, too.

Cleaning Out the Old Tuff Condensers Profitably

Ingle: Then we had the same problem with the condensers from the old Scott [furnace]. We found a bunch of yellow, which I considered was calomel. It was rich enough so that we cleaned those condensers out. They were tuff condensers, so they were soft rock. We cleaned them out, and we ran that. We had the same trouble with the dust, but the ore was so good that we could back off to maybe half of the volume that we were running from the regular ore.

Swent: These condensers were made of tuff, you say?

Ingle: Yes.

Swent: I just assumed they were metal.

Ingle: They normally were metal, but this was--I don't know what the rest of the condensing system looked like, but these were incline condensers. They're back behind the Scott, the remains of them. They were two square pipes--I mean, if you want to call them that--made out of the tuff. They had a common wall between them. I thought it looked pretty good. It looked like it was calomel and quite a bit of it, and so we ran that stuff. I can't remember how many bottles we made, but it turned out real good.

Swent: How did you run the stuff over to those condensers?

Ingle: To our condensers?

Swent: To those condensers.

Ingle: No, no. We dug the material out of them. They had all collapsed and kind of disintegrated, see. So we dug the material out of them and just ran it through. It was a disintegrated rock. It was some of the tuff from over here by Twin Peaks. They built that furnace with the tuff that they quarried over by the Twin Peaks Mine. And so it's unique that way, I think, this furnace is. What they had used beyond that, you see--those two square pipes, so to speak, went up from behind the Scott furnace.

Swent: Where the condensers--

Ingle: Yes, and they went up to that little flat which is above there, where they did have a retort. But I don't know what kind of condensing system they had. It could have been vitreous pipe or something like that. It wasn't a good heat conductor, but that's mainly, I guess, what they had. Of course, with this ore, if they had used steel, they would have had trouble with it.

Swent: I'm sorry. I'm still not clear on what you did with those tuff blocks, I guess they were, from the condenser, you--

Ingle: No, no. They had disintegrated. They were just fine material.

Swent: And you ran them through to get the mercury out of them?

Ingle: Yes. We just shoveled it out, you know?

Swent: You used it as ore, in other words.

Ingle: Right, yes, you bet.

Swent: Recycled it.

Ingle: Yes. And they had all kinds of problems because they didn't know about the oil in the ore, and so they just lost most of it. They were--well, as John [Livermore] said, he got these copies of the old board meetings, and they were always [chuckles] needing more money.

Swent: They couldn't make it work.

Ingle: No. But anyway, the secret to the whole thing was that oil, and the marcasite didn't help any, but it wasn't the real problem.

Swent: What is your host rock over here at the Corona?

Ingle: It's silica carbonate. It is an alteration of serpentine. Let's see--

Swent: But the oil would be from ancient forest?

Ingle: Well, now there's--over at Wilbur Springs I think they pumped this oil. I can't remember what rock it is over there. But, see, where the serpentine was in contact with the Franciscan sediments --the shales and the sandstones, like they have over there at Oat Hill--

Swent: That's sandstone.

Ingle: Yes. There's some shale in it, and--

Swent: So the oil is in that?

Ingle: I don't know. I don't know what caused the alteration of the serpentine. I don't remember what the theories are, but there's a possibility it was heat or something like that.

Swent: It must be pretty unusual to have quicksilver and oil together, though.

Ingle: Well, yes. I don't know whether they encountered anything like that over at Wilbur Springs or not, but I know that there were the remains of what I was told was the housing, I think, for the drilling derrick. They had this light oil, and they tried to market it. I don't know whether they didn't get enough or whether they didn't find a good use for it or what it was.

But in ours it was in these little spherules of what I think was silica. They were very small. But they break, you see, when you broke the rock.

Let me see what time it is. I better--

Swent: It's eleven-fifteen.

Ingle: Well, I guess he hasn't called because I have the thing on. Let me check. It has been about an hour. I'll find out what's going on.

[tape interruption]

The Old Corona Retorts

Swent: Okay, we're getting started again here. We have walked up to where the old Scott furnace is. There are two concrete foundations here with--

Ingle: Rectangular, yes.

Swent: Rectangular. Do you want to tell us what you know about them?

Ingle: Well, these were rotary retorts. Part of them were here when we first came. Our hot rock dump eventually covered these foundations, and John Livermore has excavated them again. But they were cast iron tubes. I don't know whether they all were running together because each one had a sprocket on it, and each one had a pipe that came out the back for the condensing system, which we didn't see, so I don't know whether they ran by one chain or individuals, but they probably charged them maybe separately so that they could run all the time because they could have charged them with them rotating, or maybe they had a way of stopping one or more at the same time.

But anyway, this was all that was here other than the tubes, and there was the remains of a building that they had had--just the framework of the building.

Swent: Were these run in connection with the Scott furnace?

Ingle: No.

Swent: No. These were later.

Ingle: Yes. Like I say, I think during World War II, and I don't know how successful they were. But you can see that probably the burners went in these pipes at each end.

Swent: These pipes are at an angle, and those over there that I'm looking at, and the ones farther on are horizontal, aren't they?

Ingle: No. I think they're all inclined. Well, let's see.

Swent: No, those are horizontal.

Ingle: Yes, these are horizontal. I'm just not sure because we didn't get to see the whole thing. But some way they must have drawn the gases out the back, and they had some kind of a seal on the rotating pipes.

Swent: But when you were here operating in the sixties and later, this was not part of your operation at all?

Ingle: No, no.

Swent: In fact, you didn't even know some of this was here, I guess. Or did you?

Ingle: Well, we knew a good part--and there's parts of it up here in this scrap pile. Like I say--well, actually, we traded two or three of them for a D retort, for this D we've got up here now.

Swent: The day that I was up here with John Livermore and Tony Cerar, we walked on up the road there and actually the manager had lived up there.

Ingle: I see.

Swent: In what I guess had been a very nice house. Tony hunted around and found a fig tree that he remembered from his childhood.

Ingle: Oh, is that right?

Swent: They had quite a nice garden up there. He remembered that there had been some fig trees, and we found one of them.

Ingle: Is that right?

Swent: Yes. But that was way back when--well, before World War I.

Ingle: Oh, is that right?

Swent: When Tony was just a--

Ingle: Just a kid?

Swent: A kid, I guess. It was the time of World War I. Was there a boom at that time?

Ingle: Oh, I'm sure there must have been, yes, yes. Now, when we had those two lessees here, they lived in that cabin; you can see the remains over there, below the road.

Swent: They leased from you, then?

Ingle: Yes. Well, actually, we were on shares.

Swent: All together.

Ingle: Yes. But then, of course, we saw part of this wall, but it's more extensive now. I don't know what they had right in there. See, there was something else, yes. But I don't know what it was.

Swent: That's in that retaining wall there.

Ingle: Yes. It probably had something to do with these rotary retorts. I don't know.

Swent: The Scott furnace would have been from--

Johnston: Eighteen ninety, probably.

Ingle: Yes, yes, I think so.

Swent: We have Andy Johnston here now, so he's--

Ingle: Oh, yes.

Johnston: We have information on when this furnace was built. It's in the book. It shows pictures of them building this furnace.

Ingle: Oh, I see.

Swent: Which book is that?

Johnston: The book in my bag.

Ingle: I've got to see that.

Johnston: It's the 1919 Quicksilver [Report of the California State Division of Mines]--

Ingle: Quicksilver in California?

Johnston: Yes.

Ingle: I thought I had that, but maybe--I don't remember seeing them building it.

Johnston: At least I hope it's there. I know I have a picture of it somewhere. I think it's in there.

Ingle: Okay.

Swent: This is a Scott furnace that's in quite good condition, I guess, considering. It's better than most, anyhow.

Ingle: Yes, but you can see the erosion, that that's a soft rock. You can see how it has worked those little hollows--not the holes but the hollowed stuff.

Swent: That tree growing out of it isn't helping it any.

Ingle: No. And it's kind of coming apart a little bit. If it were all mucked out, you could probably see a lot more.

Johnston: Is it leak damage, or is there some chemical reaction damage to it?

Ingle: That I can't say for sure, but I think probably--it's soft, and I think maybe it's mostly weathering because it has been--well, it has been--

Johnston: A hundred years.

Ingle: A hundred years, yes.

Swent: This is tuff also, isn't it?

Ingle: Yes, yes, and that I understand was quarried over here at Twin Peaks. There's soft tuff over there. You can see the old wagon wheel tracks in the roadway.

Johnston: This fire brick in these structures here behind us, the rotary retorts, that's the same fire brick that's in the Scott furnace over at Wilbur Springs.

Ingle: Oh, is that--yes.

Johnston: It's got the same label. I don't know where that's from.

Ingle: Oh, well, let's see.

Swent: It's something like Ravens, I think, isn't it? R-a-v-e-n-s?

Johnston: What does it say below that?

Swent: Manufacturing Company?

Johnston: Let's see if there's another [...].

Ingle: Yes, I don't recognize--

Swent: There's one over there, maybe, that's clearer?

Ingle: No, there.

Johnston: Snowball.

Swent: Snowball!

Ingle: Okay. There's a lot of Snowball bricks around. I recognize the name. I think they were probably in San Francisco, although--well, no. We don't know whether these bricks are used bricks, whether they came out of something else. That's the trouble.

Johnston: There's at least two different kinds, so they might be out of something.

Ingle: Yes. See, we cleaned--well, Hughie and Tony cleaned several thousand bricks for our retort up there.

Swent: Who was Tony?

Ingle: Tony Gargiulio. He's still alive. He lived in Middletown, and his son lives there.

Swent: And he helped you.

Ingle: Yes. Well, he built that retort.

Swent: Okay. Now we're looking up the hill. Did you build that stuff up there?

Ingle: Oh, yes. There was nothing there.

Swent: You built all of that.

Ingle: Built that, and the wall we built out of old power poles.

Swent: What wall are you talking about?

Ingle: It's up behind the [...].

Swent: Yes, I remember. The one up behind. We'll walk up there in a minute.

Ingle: And then we had an outhouse over there. But this last room here is the shower, and then we had a little bunk room that wasn't connected with the shower, because we had the other building first, and we had a bunk in there. This was the kitchen, and we had the stove--

Swent: And you and your wife and children all were living here?

Ingle: No, no, my wife didn't--because we were living in Middletown, and it was close. But when we were running twenty-four hours with the furnace, why, we stayed in there.

Swent: And the shower was a personal shower.

Ingle: Yes.

Swent: Where did you get the water from?

Ingle: Well, there's a little spring way up the hill there. When we first came, before we built anything, we had a hose sprinkler in a tree, and we had it hooked up to the spring. And even on cold nights we would get up there and shower.

Swent: It was warm enough?

Ingle: No! [laughter]

And we slept out in a bunk up there on the dump, in an old bed that we had, but we had to keep going. Originally, I slept over in the cabin when we first started the furnace. My father-in-law was helping out, and, shoot, I'd no more than crawl in the sack and he'd come over and say, "Hey, what do I do?"

##

Ingle: It's cinnabar. It stayed together okay. It was a high grade, in buckets. Tony--he really wore a shovel out scraping down the walls [chuckles] because we had everybody on some kind of a share. It was perfect as far as I was concerned. In fact, after we found that one little high-grade ore body that was in this black silica carbonate, I walked out of the tunnel that night, and I thought, Ah, this is getting too easy. Well, it wasn't very long until the government made sure it wasn't very easy.

I sat here with the sun coming up--I was out here alone, running the furnace. The sun came out one morning, and I looked out over the valley, and I thought, the story in the Bible about the man that had the terrific crops and built his--he was going to tear down his old barns and build new ones, and the Lord said,

"This night I'm going to take you." I thought, Oh, shoot, am I going to go now? [laughter]

Swent: Too lucky?

Ingle: Yes [laughs]. Oh, boy. But it was a lot of fun. I enjoyed it immensely.

Swent: And you did it all by yourself. That makes a difference, doesn't it?

Ingle: Yes, yes. Tony helped us build a lot of that, but, you see--see, there's the width--see that dust collector up there is just outside the edge of the roof, and the other side is that wall of the kitchen. That's the only width that we had to get in out of the rain.

Swent: Until you built this roof. Until you built this galvanized section--

Ingle: Yes.

Swent: --there, you just had this little roof over your dust collector, right?

Ingle: Well, not over the dust collector but over the--see, the width of that hot rock bin.

Swent: That was roofed over, but nothing else was.

Ingle: Nothing else was, except then we built--well, we just kind of threw together a roof so that we could hoe under there after we got the soot--

Swent: When you hoed, you mean you were mixing it in with lime, is that right?

Ingle: Right, yes. We had the hoeing table.

Swent: And that you said your wife enjoyed helping with.

Ingle: That's right, yes. She really enjoyed it. But then we got a hoeing machine, and we got that from Sulphur Bank, too. One Christmas--it was the night before Christmas, and we were out here working, and it started to snow. We had the hoeing machine, and we cleaned up and turned it on and had the soot in it. It ran for probably a half hour and nothing came out, and we thought, Oh, boy, what a swell Christmas. And so we finally went in and took

our showers and came back out, and there was a pot full of mercury there. So [chuckles] it made Christmas.

Swent: A Merry Christmas.

Ingle: We had several flasks in there, and it was worth six hundred bucks a flask, so, you know, it--

Swent: When would this have been?

Ingle: It would have been probably about '66 or '67.

Swent: When you're saying "we," who was here with you at that time?

Ingle: Let me see. I don't remember whether Tony was here yet or not. It may have been just the two boys and me, and we had one other person. I can't remember his last name. Virgil--anyway, he was from around San Jose or someplace like that. He lived over on Oat Hill for a while.

Swent: And he helped you out.

Ingle: Yes. He was an old-timer, not in the mercury business but an older guy.

Swent: Anybody named Virgil you can pretty well guess was an older guy. They don't name boys Virgil anymore. [laughter] You can sort of place them by that. But, now, your boys started working here, helping you, when they were pretty young.

Ingle: Oh, yes, yes. But Hughie--

Swent: You came in '65 first?

Ingle: Beg pardon?

Swent: You said you came first in--

Ingle: No, '55.

Swent: Fifty-five. Well, Hughie was just a toddler.

Ingle: But he didn't come then. He didn't come till actually--well, he used to come out and help me when I was working with Bill.

Swent: Well, he said this morning he had worked with you for forty-one years. How old is Hughie?

Ingle: He's forty-six. He said five years old.

Swent: All right [chuckles].

Ingle: He was out about then. He always enjoyed it.

Swent: And the other boy, Dick--he's younger?

Ingle: Yes, he's about three years younger.

Swent: And they both started pretty young, helping you.

Ingle: Oh, yes. Well, you know, it was a family affair. We believed in kids working instead of just sitting around. The girls worked up at the resorts.

Swent: Did they ever help you here, too?

Ingle: No. But, like I say, my wife did. It was a real family affair. I bought her a .25 automatic so she could take the mercury over to Guerneville if I wasn't going. Actually, some people shipped in-- I can't remember whether it was twenty-five-flask lots, but it was something like that. And some of the shipments were stolen, they were worth so much at that time. Some of the shipments were stolen off the docks, where they were waiting shipment. In the later days, we shipped with Sonoma because we knew Reed real well, and they shipped to the consumers. They didn't ship through a broker, so they got a little better price.

Swent: What was at Guerneville?

Ingle: The Mount Jackson Mine.

Swent: So you would take your flasks over there?

Ingle: Yes. And we used to go over and have lunch all the time. It was a big day when you took a shipment in.

Swent: Sure.

Ingle: And so they put it in boxes that they built for themselves. I did consulting work for them, and we were always real good friends.

Swent: And they took it on to some other place.

Ingle: They would ship it out to whoever their consumers were. It made a real enjoyable deal out of it.

Swent: I'm interested in the fact that you were sleeping very close to those condensers. What? Twenty feet away or so?

Ingle: Oh, well, of course, you were closer to the condensers when you were running the furnace. I used to sit up on the feeder, which was a reciprocating deal. I don't know who had designed it, but it came with the furnace. And it worked real well. I mean, it looked kind of like a Rube Goldberg [contraption], but it worked real well. The feed came on a small belt, kind of through a trough. Sometimes when we were having trouble with mud or something like that plugging up the feeder, I would sit up on the feeder and half the time go to sleep. And, you know, when we slept up there on the dump, and even when we were in the cabin here, if there was a change in the noise that the furnace made, you knew it and you woke up right away. But I would sit on that feeder because it was warm up there. It was handy because you had to poke the mud through when it plugged up in the plate that was at the end of the furnace. And if it plugged up, then you had troubles with the furnace. But it was a real good operation.

Swent: Yes, we'll go up in just a moment.

Ingle: Let's see. I told them I'd be back in a half hour. It's just about--

Swent: Can we go up there, or shall we go up later?

Ingle: We better go up a little later. But what I'll do is go finish lowering that down, and then they can--

Swent: I want to pick up just one little item that we left kind of hanging. You had talked about the acidic water that ate through--

Ingle: Yes, the rail.

Swent: The pipes or something.

Ingle: Oh, the condenser pipes.

Swent: Yes.

Ingle: Part of those old condensers are up there. I can show you what it was like.

Swent: Okay.

Ingle: And also the parts that were here. The little rollers that those rotary retorts ran on were all on a piece of heavy strap, and we took them off when we were going to bury this thing with the hot rock dump. We took them off because we thought we might have use for them.

Swent: Metal straps.

Ingle: Yes. And so they're up there in that pile of scrap. Anyway, like I say, it was a fun time.

[tape interruption]

Swent: All right, now we've come up to--is this what you call the number three level?

Ingle: Well, it's the main level of the rotary furnace and the retort.

Swent: Okay. And we're sitting at the site of the old retort and the condensers.

Ingle: Well, the rotary furnace.

Swent: The rotary furnace is right behind us. Why don't you just start by telling us--up above us is what you call the number three level?

Ingle: We didn't really have level numbers for it. That would be the crushed ore bin level.

Swent: Where did the ore come from?

Ingle: We brought it down here in bobtail dump trucks. One of them we've still got. We brought it from that little bin up there that the tracks come into, and then we would dump it here and stockpile it.

Swent: Up--

Ingle: On the top--

Swent: Did you do any sorting?

Ingle: No. Well, we mined it pretty careful, but we didn't really do any sorting.

Swent: Really!

Ingle: So then we dumped it on the dump level up there, and then we used the loader to put it in the bin, except that when the bin was empty we could just dump right into the bin, and there was a grizzly--there is a grizzly--

Swent: That's still there.

Ingle: Yes, on top of that bin. We fed it down to the jaw crusher up there, which is still there, except for one flywheel that somebody stole. I thought they probably broke their back when that came off [chuckles] that axle. But anyway, we just had a little grizzly in that chute. We operated the gate by hand. That fed the crusher. And then we had a horizontal conveyor over to the bin here. Eventually, we had another cross-conveyor so that we could fill the bin full without having to hand muck it, to get into the corners and everything.

Swent: What kind of conveyors were they?

Ingle: Belt conveyors, regular conveyor belts, and troughing and rolls.

Swent: Where did you get those?

Ingle: Well, one of them we made because it was wood. The short one, the cross-conveyor we got from the Sulphur Bank. We've got it in use over in Nevada now.

Johnston: Where did you get the crusher?

Ingle: What?

Swent: He wants to know where you got your crusher.

Ingle: That was at Wilbur Springs, with the furnace.

Swent: It must have been a big job to move that over here.

Ingle: Yes. All these things were done with sweat and blood, I'll tell you.

Swent: That crusher is--how much does it weigh?

Ingle: Well, the crusher, I don't know. It might weigh 1,500 pounds, something like that. It was an old one and it did us fine.

Swent: You had to build a foundation for it and everything.

Ingle: Well, we built it out of iron because concrete is always--I don't like to use concrete because it's so permanent. And besides, now, with EPA and BLM, you've got to blast it all out if you put it in. So our mill is all mounted on trailers and skids because, you know, we didn't want to get into that kind of baloney.

Anyway, it came on that little cross-conveyor into the bin here, so we no longer had to come mucking around to get a full bin. And then we came out this--there's the little feeder I was

talking about that I used to sit on and about fall asleep. It worked fine. It was a little bit of a Rube Goldberg, but we got it with the furnace. You can see that the burner went through that hole there. We had a Hauck burner, which was the Cadillac of burners at that time.

We burned diesel. We could have burned bunker oil, but you had to get it in too large a lot, and we didn't use that much diesel. It was a small part of the cost. That's the little chute that would plug up when we had clayey stuff. No, that's where the burner went. Yes, that was the chute. And we would sit up there on that conveyor with a bar and poke it through, yes. And then it went through the furnace and into the hot rock bin, and then we had a mine car underneath the hot rock bin, and we would take the hot rock out in that.

Johnston: How long would it take to work its way through the furnace?

Ingle: Oh, boy. I don't remember exactly, but it probably took--well, we put a ton an hour through it, yes, so I guess retention time was probably just about an hour.

Johnston: How many times a minute would it go around?

Ingle: And I can't remember that. We set it at what the recommended RPM was.

Swent: How long is it?

Ingle: Oh, doggone it. I meant to bring my tape up. Have you got a tape? Yes, let's see. I can't remember exactly, but I think it's a twenty-four-inch by twenty-four-foot, maybe. He'll have to measure it. But we built all this up. We had to--

Swent: This is, again, on a metal foundation.

Ingle: Yes. But, you see, that frame came with it. And we just used what was there. Those lower trunnions we got from another furnace. They just happened to be about the right size, and we altered the frame to make them fit. The furnace turned at--I don't know--it was probably one to two RPM, but I don't remember for sure. So we discharged the hot rock, and that's the dust collector.

Swent: Ah. Just a second. Let me get up there so I can--

Johnston: It's twenty-three feet is what I measured, so it must be--

Ingle: Probably twenty-four, yes. And twenty-four inches in diameter, I think.

Swent: Now, this stuff then came out there.

Ingle: Yes, that was the dust.

Swent: And got conveyed over to here, the dust collector.

Ingle: Well, we had a recording pyrometer up here. Let's see. I don't remember. We might have emptied the dust just into a wheelbarrow or something, or we might have--No, I guess eventually we had it go down through that pipe. That was part of the old condenser from Sulphur Bank. We didn't use those pieces, so we used them for whatever we could think of. Some of this stuff I can't quite remember everything, but I assume that what we did was pull the slide and let the dust go down there. And then we took it through these condensers--

Johnston: Wow!

Ingle: We replaced those, and they were really heavy--heavy steel, and yet they're all rotting out at the bottom now. But we built this framework, and we had--let's see. These were the hot pipes. One, two, three, four, five, six, seven, eight, nine--nine of them. And that was--let me see. I think that frame came with the furnace. We eventually put concrete--we jacked them up--because we started with just dirt--we jacked them up and then put concrete under there.

And so these were the hot pipes, and then we went through this blower, and we had to replace the bottom with stainless steel. Instead of getting a whole blower, we just replaced part of the innards with stainless. And then we came out of the blower, and we split the gas flow and put part of it--well, they've taken the connection off up there--but we split it and put part down this row of condensers--

Swent: That's five--

Ingle: --and five down that row.

Swent: Five on each side, is it?

Ingle: Let me see. Yes, there's five on each side. I don't remember what the diameter of those are. You can measure them, maybe, Andy, and see. But then we came out of that--and this was all stainless. Let's see. No, I guess there's six in each bank, so that would be--

Swent: Okay, yes, six.

Ingle: That was where we had the hottest gases. Since they would be the least corrosive, we put them in where they would be hotter--they came from the Sulphur Bank--we built all this frame. The rest of these were, I think, the same diameter, but they were stainless steel. Then we--and I don't remember--let's see, we could have had probably six more on each side.

Swent: But they're gone now.

Ingle: They were apparently stolen or at least borrowed. And then they went into this--oh, what did I want to call it? Oh, doggone it. Anyway, then these two rows of pipes fed into this about twenty-inch manifold, is what I was going to say, and that manifold ran up here and went over the generator house. We had the generator up there on that upper level at first, right by the tank, but then we put it in here, and we had a little shed over it. And then we came over the top of that, and the wine tank was sitting up here. I guess part of this is gone out. I don't know whether it was timber. Or it might have been clear up here.

This manifold served as an expansion chamber. Then the wine tank served as an additional one, and then it went up through the stacks. But the reason for the expansion chambers is that your gas flow then slows way down, and so you capture a little more mercury that might be in the form of little tiny beads. I think we only cleaned the wine tank twice in all the time we ran. We only got about, oh, not over four to six bottles out of it, and the rest of it was all in the other condensers.

Johnston: Where would you get most of your mercury?

Ingle: Well, I'll tell you--

Swent: That's what I wanted to ask, too. That first bank of condensers, there were drains at the bottom. Is that where you were--

Ingle: Well, on all of them there were. We had rubber buckets under them. See, we had them in boxes so that we didn't lose anything. Yes, we got the most out of that one, just this side, on the downstream side of the blower.

Swent: Now, what precisely was going through here? Was this gas?

Ingle: Yes.

Swent: All gas that was going through there, okay. And then at the bottom you would have your buckets, which were retrieving liquid mercury, right?

Ingle: Right. And soot.

Swent: All right. It would filter down to the bottom, and then the gas would go up and down and up and down.

Ingle: We got our--I won't say most of it, but a great deal of it was in the bucket under that blower.

Swent: That's between your first and second bank of condensers.

Ingle: Yes. We didn't get near as much through these. These were just cooling it. But I remember I was trying to lift a bucket out of there. I was by myself, and Kurt Kritikos went by on his motorbike, and I called to him and I said, "Hey, come up here and help me." I couldn't lift the doggone bucket out of there, and I was pretty stout in those days. So he came up and helped me.

Swent: You couldn't stop the flow while you pulled the bucket out, could you?

Ingle: No, no.

Swent: So how did you do that? You moved another bucket into place?

Ingle: Yes, but we had pieces of inner tube on the bottom of these condenser pipes, and they extended down into the bucket and into the water in the trough so that it wasn't exhausted to the atmosphere; it was contained in the trough. The water, of course, quickly condensed the mercury.

[The following section was transcribed later due to technical problems with the tape, and was not reviewed by Hugh Ingle:

Ingle: Well, the only thing we did was when we filled the buckets--you know, flour mercury will float, at least some of it will. And so we didn't want it to get away. It's real fine, little tiny beads; if you look at it under a [magnifying] glass, you see those beads. So all the boxes did, was hold anything that spilled out of the buckets. And when we changed the buckets, then if anything fell out of the condensers, at the time it went into the box, and then we cleaned the boxes out with a shovel or a scoop or whatever we had.

Swent: How often did you run a charge? Once you started, it was a continuous twenty-four-hour operation, but did you stop periodically?

Ingle: No, we washed down; we used masks and the only time we used a mask was when we pulled the hot rock and when we were washing down. Or if we were working around these things.

The first set of pipes that we had in there, when we replaced them with these, they were nothing but fiber glass. Because what we did was, when they started to leak, we would wrap them with fiber glass, so by the time we were through with them, they were just kind of a bag of fiber glass. We used them up because we didn't have the money to replace them until we got a little money.

Swent: Did you operate this every single day?

Ingle: No, we operated it ten days a month.

Johnston: Was that based on the capacity of your ore bin?

Ingle: No, it was based on what we felt we needed and the rest of the month, we mined. So it took us the other days to get enough ore to get a ten-day run. Then of course we had the lessees here; they were mining all the time, and so we were running the furnace when they got the ore.

And this was our hoeing room. It was up under the tree to start with; that's where we set it up first, but then we built this and then we put the hoeing machine in here; we had the table in there too.

The manifold went right over the roof of this. The pipe conducted the gas right over the bin. The manifold was supported but it was above the roof. And we had the hoeing machine set up and we had a pot over on this side that the hoeing machine emptied into.

Swent: Where did that come in your cycle?

Ingle: It was when we washed down the condenser pipes; it came in the soot. It contained the mercury and so we had to hoe it. That was kind of a separate process. That was intermittent.

Then we put concrete every place we could. We had another little wine tank down the hill here. We had long drainage; we collected everything from the floor after we got the concrete and after we washed down the floor we collected it all in that little tank down there. We didn't get very much out of it.

Swent: Then you said there were stacks up here?

Ingle: On top of that wine tank, to get the gases up high. [end insert]

We had a cat that we--let's see. Doggone it, what did we name her? [Sally, short for Salivated.] Anyway, it had something to do with mercury. She stayed out here all the time and drank out of the boxes. Then we took her to town. We eventually gave her to the fellow's place where we were staying because they had that big ranch. He was running that big ranch, and they had all kinds of cats. He said a few more didn't make any difference. But she was out here, and we always called her a naughty lady because, boy, after she got to town, she had kittens as often as she could [chuckles], and we just couldn't take care of them all.

Getting Access to the Corona Mine

Swent: We came up here this morning, and Hughie was lowering some equipment. Can you tell what it was?

Ingle: Yes. We got some parts ready, and then Hughie lowered a twenty-foot section of track that was welded together with three metal ties, four-inch flat ties, and we lowered it with the hoist and let it slide on the rails that were in place, and slide down to the end and then drop off and be pulled it back into place, where he could use the track bolts and the fish plates. Then he welded the ties to the bridge, so-called, which is across this depression in the rock so that we couldn't lay rail to follow the contour of the hill at that point.

Swent: Was that also what you were calling the trestle?

Ingle: Yes. We variously call it a trestle and a bridge.

Swent: It's the same.

Ingle: Yes, because it started out we thought we'd have to have more legs under it. Now it looks like maybe just one set of legs would be plenty.

Swent: About how far down is that?

Ingle: It's--let me see. I can tell you exactly. The end of that twenty-foot section of rail is 383 feet down the hill.

Swent: Below us here.

Ingle: Yes.

Swent: It's almost straight up.

Ingle: Yes. It's actually 200 feet below where we're sitting because it's--on the rail it's 383 feet.

Swent: Because of the bend.

Ingle: No, no, because the rail starts a little below us. It doesn't come right up to the hoist. What he and his crew are doing now is putting in a rotating drum because there is an angle, a horizontal angle in the roadway that's got to go down to the dump, down below, and so, in an effort to keep the cable in the center of the track, there has to be a rotating drum where it makes the turn, and there may have to be more than one, but we're hoping we'll get away with just putting one in and that it will be stout enough.

Swent: What was the term? Snatch block is what you said you've been using?

Ingle: Well, yes. That's a term for a block that--the wheel rotates, but it's got a shroud around it. We couldn't use something like that because we have to move the cable, the inside side of the cable in, and if we put a snatch block on, then there's a shroud on it and a cable to an anchor, but the car can't go by because the cable that pulls the car--it has to be undone so it can go by, and we have been using that temporarily until we get this drum in.

It's our own device. We had to stew for a long time to figure out how we were going to do that because the bail on the skip has to come around that thing, and that's why we can't put anything in the middle of the track because it might flip out, and if it does --we've got a drum that's high enough so it can't. But if it should, that cable would end up thirty feet out in the brush. If anything happened, it would drop the skip to the bottom, or more, and that cable would just snap through the brush and probably chop it all off, so we have to make sure that that doesn't happen. And, if anybody is walking by the thing with a load on the skip, he'll have to walk on the outside because then if that should snap, why, it could cut your legs off.

Swent: It's a very risky thing that you're involved in, isn't it?

Ingle: It is in a way, but if you just follow common sense and take your time and be careful, then it's not that bad.

Swent: As you said, it takes a lot of patience, doesn't it?

Ingle: Well, yes, yes. You just can't rush it because if that skip went off the rails, I don't know what would happen; it would be a catastrophe.

II GROWING UP WITH MINING

[Interview 2: April 5, 1999]##

Helping in a Pocket Gold Mine at the Age of Ten

Swent: So now here we are in Yerington. Hugh, we talked the other day, of course, up at the Corona Mine. We did a couple of hours of talking up there about the mine. But now we're going back to the beginning. Let's start with your family and your background, your childhood and so on. When were you born?

Ingle: On August 17th, 1923, in Santa Rosa, California.

Swent: What would you like to tell about your family, your background?

Ingle: My father was a mining and civil engineer. We moved, as I recall, I think the last count was seventeen times while I was in grammar school.

Swent: Oh, my!

Ingle: Well, it was Depression years, and so things were not very good. My mother and my father--they never got a divorce, but they were apart a good deal of the time. We ended up living with a couple of aunts, my sister and I, on a ranch out of Santa Rosa. So we got out of school for harvesting hops and cherries and anything else that was available in the neighborhood because the kids did that kind of work then. They let school out so they could do it because the families depended on their kids to help them out.

We had our problems, but looking back on it, I appreciate more what my aunts did in their older years than I did then because we had arguments about--problems between my mother and father and that sort of thing, and it kind of had an effect on me. I learned to get along and to do what had to be done. I kept my goals in mind.

When I was ten years old, in 1933, my dad was working on a little pocket gold mine up in Gold Hill, Oregon. In the summertime we moved up there. He gave me a candle and a lard bucket and a pick and a shovel and steel-tired wheelbarrow, and took me underground and showed me what little stringer he wanted me to follow. It was a pocket property.

He wanted to drive this drift on it, so that's where I got introduced to mining. I've liked it ever since because you took something that was worth nothing and you made it worthwhile, and you didn't have to destroy somebody else's business to be successful in your own. In fact, there was cooperation then among the small miners. They would help each other out, instead of trying to sink one another.

Hugh Ingle, Sr., a Mining and Civil Engineer

Swent: Tell me about your father. What sort of training had he had?

Ingle: Well, he went two years to Houghton, Michigan, College of Mines, and then financially he couldn't handle it, so he came out West.

Swent: When was he born?

Ingle: Let me see. I can't remember.

Swent: I'm trying to think what the Michigan mining scene was; of course, it was booming in the late 1800s.

Ingle: No, I can't remember whether he was born before the turn of the century. I think he probably was, probably around 1895 or '93 or somewhere in there.

Swent: So that was when those Upper Michigan mines were terribly important.

Ingle: Yes, yes, they were. And Michigan was a top school then. I don't know where it stands now.

Swent: I think it's still good.

Ingle: Yes. I think one of his uncles paid his way to go to school, but then the money ran out, and so he came West. Well, he served in the army back East as a surveyor during World War I, and then he came West. He married my mother, I think, in Portland, Oregon. I can't remember for sure. Janet probably knows better than I do.

Swent: Janet is your wife.

Ingle: Yes. But anyway, he had numerous jobs with the Oregon State Highway Department and the California State Highway Department. He did quite a bit of civil engineering. He built some dams and some little power plants and that sort of thing, and then he worked on the City of Medford airport, just before the war. With that experience, he went down to Sacramento and worked for the Army Engineers, and he was in charge of--

Building Airports for the Army Air Force

Swent: Which war, World War II?

Ingle: World War II, yes. Then they put him in charge of the original, the starting phase for all of the Sacramento region airports, military airports--army. It was Army Air Force then. He did the preliminary work on Lemon Valley and Lemoor and Beale and all the airports. I mentioned Stead already; [he worked there] in the 1940s. And then he had other chores, too.

Swent: He was not in the army.

Ingle: No, he was a civilian, yes. I made some trips with him. Before that, he had charge of some drouth wells out in eastern Oregon and that sort of thing, so it was a varied experience record for him.

Swent: Was he an independent contractor or working for other people?

Ingle: No, he'd go to work for, like the Highway Department for a project. He'd be the engineer on it. And then when that project was done, a lot of times things were terminated, so then he would have to find something else. It was pretty difficult. Then we had a couple of little placer mines up in southern Oregon.

Working Placer Mines in Oregon and Hunting for Survival

Swent: What sort of arrangement did he have on those?

Ingle: Well, one of them he owned. Another one, he had a lease on it, and he had a couple of partners--well, three partners. They finally got some nuggets together. The gold was coarse, but so

were the boulders. The boulders actually were what whipped them. They had one jar of gold, and this one partner took off with it.

Swent: Oh!

Ingle: But when I was sixteen, I got muscle-bound. We'd be in the creek at six o'clock in the morning, throwing boulders, and we'd come out of the creek at six o'clock at night.

Swent: Oh, my.

Ingle: And then sometimes, if we were out of meat, we'd have to sit in a deer blind all night until we got some meat. It was interesting because these deer blinds had salt licks in front of them. One of them was a hollow tree with benches around the inside and an official Forest Service sign over it, Rangers Temple. The placer mine was eight miles from the end of the road, and we had to pack everything in. This Rangers Temple was four miles further up the creek. And so we'd work six days a week, and on Sunday we'd get up at three-thirty in the morning to go down get a backpack load of groceries and whatnot and come back, and then prospect in the afternoon. And so I got muscle-bound pretty fast. I couldn't raise this arm [demonstrating] above the table without putting this other hand on it. Of course, I was eating twenty-two and twenty-three plate-sized sourdough hotcakes for breakfast and a little bit of venison or whatever else.

Swent: I don't understand the Rangers Temple.

Ingle: Well, it was a hollow tree. There were benches around the inside, inside the trunk. Then there was a peep hole to look out on the salt lick. This official Forest Service sign said Rangers Temple. It was a deer blind, and people--they wouldn't be twelve miles from the road if they weren't hungry. So that's the way we got by. We had sourdough hotcakes, and we had venison in the brine barrel, and once in a while we'd have a few mules come in with a load. But by and large we carried everything in on our backs on a Sunday morning.

Swent: I'm still not clear on what the Rangers Temple--what the sign meant.

Ingle: Well, it was obviously a deer blind.

Swent: Right.

Ingle: And so somebody in the Forest Service had made up this sign, see. But it was one of those porcelainized signs, you know. It was an official sign.

Swent: Because you were not supposed to be hunting deer there, is that right?

Ingle: That's right.

Swent: Okay. If the rangers had caught you, you would have been in trouble.

Ingle: Well, they wouldn't. I mean, by law they were supposed to, but my father-in-law was a game warden during the Depression, and he never turned in anybody who was out hunting for meat.

Swent: They were hunting for survival, really.

Ingle: Yes. If you tried to sell it, why, that was something different. But most of the people then were out for meat. We wouldn't have sat all night in those deer blinds for the fun of it.

A Hard Life, But Satisfying

Swent: I think it's interesting that this didn't turn you against that way of life. You must have admired it.

Ingle: Well, these people were good people. They were hard-working. We used to have to pack water from the spring on that first property, and we lived in a tent. It was a hard life, but it was a satisfying life.

Swent: It must have been.

Ingle: Yes. I got an under-the-skin--I don't know what it was, but it was an infection from picking by hand, you know, and the vibration. My father tried to lance it with a razor blade because we didn't have enough money to go to the doctor. But finally it got so bad I used to have to sleep in the tunnel because it was cool there, and so he took me to the doctor. Boy, I thought he was going to go clear through the hand. But it burst like a boil. My dad got one of those, and this woman who owned the claim--her son got one of them, too. It was from this jarring with the pick handle.

But it didn't change my mind. I thought this was the way to go. But it was hard work.

Swent: And you were doing just hand picking?

Ingle: Yes.

Swent: Blasting?

Ingle: Well, yes, we had a little bit of powder where necessary, but if we could pick it, we had to pick it.

Swent: It was high grade, then.

Ingle: Yes. In fact, this woman lived to be a hundred and five or six or something like that, and she told us that in the early days, probably in the 1920s or something like that, that she and her husband had hit a rich pocket. They had a cabin down near the Rogue River. I mean, it was a fairly nice house. They had carpeting on the floor and everything. She said that the neighbors brought food into them so they wouldn't stop hand-mortaring this ore and panning it out. See, they did it on the front room rug. But it was so rich, you know, that a little bit went a long ways.

When I was there and we had the placer mines, every little crossroads grocery store had a gold scale. You didn't get money; you just paid with gold. They knew what the fineness of the gold was, and so they'd pay you accordingly. They'd just weigh up the gold and you got the groceries.

Swent: Is this what you did with your production?

Ingle: Right, yes, some of it. But it was a different way of life. We had one big Norwegian that--oh, and I'll tell you a funny story. He used to pack twelve miles, and he'd carry 150 pounds on his back, in a knapsack, not on a pack board, but in a knapsack. He was tremendous. And then this other guy did the cooking. John would get up about five o'clock in the morning and start the kitchen fire, and then Fred would do the cooking.

John was in the bunk house with me, and Fred would sleep in the cook house. A civet cat came to live under the porch of the cook house. John was bragging about how--you see, he said, "Now that that civet cat has come here to live, we've got no more mice." Well, Fred knew that there were mice in the cook house because he slept there and he heard them. He decided to teach John a lesson. He stayed up all night one night. He had a bunch of mousetraps. Every time he heard one go off, he'd get up and take the mouse out and line it up in front of the door. So when John came down to start the fire in the morning, he had twenty-two mice lined up. [laughter] So, you know, there were fun times.

Mining with Picks, Monitors, and Pans

Swent: Sure. So you said that--well, how were you treating the gold? You were picking it out by hand or blasting sometimes. Did you have any sort of concentrating?

Ingle: Yes. Well, we used monitors--giants, we called them.

Swent: Hydraulic.

Ingle: Yes. We had a high bench. We'd run the giants for a week or so, and then we'd make a cleanup. What I enjoyed the most was--

Swent: Where were you getting the water?

Ingle: We had a ditch from a long way up the creek. We had about, oh, 150 feet of fall, I think, and so we had pretty good power. We had a little sawmill in there, too, that we could make our own lumber. I used to enjoy panning the potholes in the bedrock because you could get--jeez, the gold would be all over the bottom of the pan when you got through.

And I rigged up a little deal of my own in the bank of the creek. It took me most of my spare time during the summer to get it rigged up, so I didn't have much time to run it, but--

Swent: This was only in the summer that you were doing this.

Ingle: Well, I was only there during the summer because I had to go down to school.

Creating a Device to Lift Large Boulders Out of the Workings

Swent: Were the other people there year 'round?

Ingle: Two of them were. And then they had about two extra people during the winter because there was a lot of work during the winter. You had to get your work done while you had water. During the summer, they would make preparations for the winter. We had about a 150-foot boom that we used to raise the big boulders with. We chained them, and we had to lift them out of the workings--the big ones, by chain, individually; and then we had a little--I don't know what you'd call it--kind of a skip, made out of small poles that were held together by cables.

When you lifted it, the poles would kind of come up and make a basket. Then the boom swung out to dump by gravity, and then you pulled it back with a donkey engine because you just had a double-drum donkey, so one drum was to raise the load, and the other one was to bring the boom back after it had gone out by gravity. When it got to a certain point, you'd pull a rope, and that would dump it. It would unlatch, and the skip would--and then the poles would hang vertically and dump the rock.

Swent: And this is the rock that you washed out with your monitor.

Ingle: Yes, yes, but we had to lift them out of the pit.

Swent: You had a bench that you were washing--

Ingle: Yes, washing, yes. It was above the creek.

Swent: And then it went down into the creek?

Ingle: No, no. The upper bench--there were at least two of them. The sluice box was up there, you see, but then we had a long sluice box down in the creek bed, and that was a wintertime job. We had what we called a hydraulic stacker. What that was--it was kind of a grizzly and a monitor, you put one monitor that would sweep the boulders off the grizzly and put them in a waste pile. The finer material would drop through and go through the sluice.

Swent: That was what had the values.

Ingle: Well, yes, but the upper benches had values, too, yes. I think the biggest nugget we got was fifty dollars or something like that at twenty-dollar gold. You would celebrate when you got something like that.

Swent: How did you divvy up--what arrangement did they have?

Ingle: I don't remember, but I think those two guys were equal partners with my dad. They were good--I mean, everybody worked hard.

Mining Just for Subsistence

Swent: I'm trying to think what they did then. Every few weeks they collected the gold that they had and went to town?

Ingle: It depended on whether they needed some grub or not. I don't know that they made periodic--uniform periods. It was just a case of when you got enough for beans.

Swent: If they had more than they needed just to buy supplies, what did they do with it?

Ingle: I don't think there ever was more.

Swent: Really.

Ingle: Yes. I think my dad fed a little into it all the time to keep it going.

Swent: So you weren't selling it to an assayer or a gold buyer.

Ingle: No. By and large, we sold just to the little stores. And you know, the storekeepers were not bloodthirsty like they are today-- I mean, most of them are today. You could run on credit. There was one time when one of the miners down the creek--he was working by himself, and he got injured in a cave-in, and the bank came in. They took a crew and went down and packed him out. He was about four miles out to the road, and they packed him out and sent him to the hospital. And then, unfortunately, a bad character moved up the creek and he stole everything the guy had.

Swent: Oh!

Ingle: But that wasn't normal. Also, there was a cabin down below our camp, about two miles or something like that. The owner put a sign on the door, and he said, "Help yourself to the wood or the grub. Replace the wood." He didn't charge anything. Or you could mine a little gold if you wanted, if you needed it. And then this guy moved in and jumped his claim and robbed this guy that had gotten injured. One rotten apple, and the whole thing goes to pot.

There was another guy down the creek that made all his own furniture. We used to have bear meat and venison, and we'd stop there, and he was real hospitable. He stayed there by himself through the winter. I remember--boy, he must have lived to be in his eighties. I remember that one winter he didn't come out for about six weeks, so they went in to find out whether he was okay, and he was all right. He had cut enough wood and everything, and he mined a little gold.

Panning Even the Crows of Birds

Ingle: We had a bird they called a water ouzel. I don't know whether you've heard of them or not.

Swent: I have.

Ingle: Okay. Well, one day he saw some nuggets in his sluice box, and he left them in there and went up and had lunch, and he came back--and they were gone. The only thing he could see around was this water ouzel. You know, they pop up and down like that. Well, he shot the water ouzel and he got some nuggets out of the crow.
[laughter]

And then we had some friends at another placer property, and they panned all the crows of the chickens and the ducks, and they got little nuggets out of them.

So it was a scramble to eat. My dad bought five goats. One of them we thought was pregnant, so we didn't milk it. And one of them was giving good milk, and the other three were duds, I guess. We bought them for the milk, and only this one goat would give milk. I had the job of milking them. We turned up a little--you know, they used to have a triangular little chicken shelter?

Swent: Yes.

Ingle: And so we turned it up on end, and put the goat up on there, and that doggone goat, he would let me get the bucket--you know, we'd use a small bucket, but it let me get the bucket almost full, and then it would step in it.

Swent: Oh!

Ingle: Like I say, it was a rewarding life, I thought. I've loved it ever since. And that's what disappoints me about the way things are now.

Swent: I'm just thinking: When you went back to school in the fall, you must have had a lot of stories to entertain your friends with.

Ingle: Oh, yes. When we stayed up there, we would go to school in the dark and come home in the dark. We met at a big pine tree. There was a four-way crossing of county roads, and so a bunch of us would meet there. And then we'd get the bus.

Swent: What was the nearest town?

Ingle: Weimer was just a crossroads and a store. And there was a school there.

Swent: That's where you went to school?

Ingle: Yes. We had an old, rickety bus. You loaded from the back. But there was a door on the front, too, but the seats were along the side. They were benches. One day--

##

Ingle: One day it had rained hard, and we got on the bus to go home, and the driver pulled off the road to let some students out, and that whole side of the bus sank. I was on the uphill side, and I stood on my head in the lap of somebody on the other side. We had to leave the bus there and walk the rest of the way home.

Swent: Oh, dear. What grade were you in at that time?

Ingle: I think it was the third grade.

Swent: Oh, you weren't in junior high school or high school.

Ingle: Oh, no. Not then.

Swent: But when you were doing all this hard work, you were bigger?

Ingle: Well, yes, yes. I was in high school when I started doing that.

And then one day the bus didn't come, and so we decided we'd walk to school, a whole bunch of us, you know. The grader operator was towing his--he had an old touring car, an open-air job. He was towing this, and so he thought he'd give us a thrill, and so he stopped suddenly and thought he'd throw us off. But instead of that, he bent the tow bar between his car and the grader. Oh, yes, it was--

Swent: So your mother was up there at the mine, too?

Ingle: She was, not when we were at Sucker Creek on this one, near the Oregon caves, where I was working that hard. But she wasn't there. She was in Medford. And then she was where we had this bus, the old bus. She was there on that claim. That was a bust. I had a good little place I could dig in and get a few nuggets, but my gosh, my dad--he spent the winter running the sluice box, and when he brought the pan full [?] at the end of the season, there was just a lot of--just a little bit of fine gold.

Swent: Oh.

Ingle: That about ended the mining for a while because there wasn't any money to keep going.

Swent: Where did you go to high school, then?

Ingle: The first semester of high school, Dad got a job as an engineer with the WPA. It was over in Klamath Falls. My aunt and my dad and I moved there, and my sister went down to the ranch in California to live with my aunts.

Swent: Were those aunts your mother's sisters?

Ingle: No, no. They were my dad's sisters. I was in Klamath Falls for the first semester. No, let me see. That was--yes, it was the first half of the seventh grade I was in Klamath Falls, if I remember rightly. And then I went down to Santa Rosa. And then the first semester in high school I was in Chico, where Dad had a job with the Highway Department. And then I went down to Santa Rosa and finished high school and went to junior college there.

Swent: Yes, I remembered that from before. You had talked about it.

Ingle: We stayed there. My mother got a house, and we took in boarders, and so I went through junior college when I was there, and then I went up to Mackay [School of Mines, University of Nevada]. I think I told you how that came about. See, Santa Rosa Junior College was supposed to be a good engineering school. If you graduated from Santa Rosa Junior College, you were ahead of the second-year students at Cal.

I was going to go to UC Berkeley, and then after the semester had started at Nevada, my dad was working with a guy that was a graduate of the University of Nevada School of Mines, and so he said, "Why don't you go up and see about that?" And I went up and looked at the campus, and a couple of my old friends were up there, so I started. I changed my mind. I liked it. Instead of three thousand students with a loudspeaker, you know, there were about six or eight students in a class.

III WORLD WAR II BEGINS A FORTY-YEAR CAREER AS A NAVY FIGHTER PILOT

Mackay School of Mines Trains "Desert Rats"

Ingle: I'm forever thankful that I went to Nevada because those were old desert rats. In fact, when the director of the School of Mines retired, I used to correspond with him, and he said--

Swent: What was his name?

Ingle: It was Jay Carpenter.

Ingle: He lived in a tent and had a couple of old desert rats living with him, and they were trying to develop the Linka tungsten mine. He was probably doing better than he did as the director of the School of Mines. But those people at that time in the School of Mines were dedicated. I mean, they loved mining. They told me when I graduated and had a B.S. and I had a chance to get a fellowship or something like that, they said, "If you really like mining, you won't go for more than a B.S., and then you'll get out and get in the industry, and you'll enjoy it." So that's what I did.

Swent: As I recall, though, you didn't go straight through. Did you go straight through?

Ingle: No, no.

Swent: You stopped and went in the navy.

Ingle: Yes. I had two years of junior college, and I had figured to spend three years in junior college, and so I took journalism, and I took drama, and I took public speaking, and those things because I was a year younger than most of my classmates. I thought I could spend three years. I started in 1940. Then, of course, '41, December, why, the Japanese bombed Pearl Harbor, so that

changed my plans. I went to Nevada after two years, and then after one year at Nevada I enlisted in the navy. In fact, I enlisted in December of '42, I think it was, yes.

Swent: You were at Nevada at that time?

Ingle: Yes. I was there--let me see. I graduated from high school in '40, so then I went two years, and so--and Pearl Harbor came along in '41, and so I finished that year in junior college and then went up to Nevada. Then I enlisted in December of '42, and then I didn't get called to active duty until July or August of '43, I think it was.

Navy Flight Training, 1943

Ingle: I went up to Susanville for WTS, which was War Training Service, you know? These junior colleges had flight programs. I had never flown, but a cousin of mine--I mean, the wife of a cousin of mine had served with the Royal Air Force, and then he had come back and was in the U.S. Air Force. After talking to him, I decided that was for me, and then I went through--well, I put in three and a half years.

Swent: You went to Susanville first?

Ingle: Yes, I went to Susanville, to the WTS school, which was a War Training School, I think, and was there until a little after Christmas. No, wait a minute. Let me see.

Swent: Did you go in as an officer?

Ingle: No, I went in as a V-5 aviation cadet. First, I think we went to Cal Poly to flight prep school, and then we went to Susanville to do our first flight training.

Swent: Was that at San Luis Obispo?

Ingle: Yes. And then we went to Susanville for our first flight training, and then we went to preflight at St. Mary's, and then I went to Olathe, Kansas, for primary, and then to Corpus Christi for advanced flying. I got my wings in--gee, I think it was on my sister's birthday in--oh, let me see. What would it have been? Forty-five, I guess. It was in April. Well, shoot [moving and getting document]--here's--18th day of April, 1945.

Swent: Okay. Got it framed and on the wall. National Air Training Center.

Ingle: Yes.

Swent: And this was from?

Ingle: Corpus Christi, yes. And then I went to operational training in-- oh, let's see. It was in Florida. Oh, shoot.

Swent: Pensacola?

Ingle: No, no, it was Sanford, Florida. They had fighters there. They had F-4-Fs. And then I went up to Great Lakes for checking out on a carrier. You may find this hard to believe, but they had two carriers on the Great Lakes. One of them was a stern wheeler, and one of them was a side wheeler.

Swent: Oh! [chuckles]

Ingle: And so we got our first landings on that, and then we got our first cat shot on the ground at Glenview. Just before I got there [chuckles], the--

Swent: Your first "cat shot," you said?

Ingle: Catapult shot. This catapult that they had there was on the ground. Shortly before I got there--it was a self-cocking device, and it would fire either way. You know, you were supposed to have your hook locked up. Well, this one guy didn't get it locked, and the catapult fired him. The hook came out and grabbed the cable and cocked it and threw him backwards into a fuel truck.

Swent: Oh, my.

Ingle: I don't know how long his neck was! But anyway, that was the beginning of the flying career.

Swent: Did you go out to the Pacific then?

Ingle: No, I went to Atlantic Fleet pool. That's where I met my wife.

Swent: Where was that?

Ingle: It was Grosse Ile, Michigan. She was living with her grandmother in Wyandotte. I tried to give her a show with a Hellcat. I went up to her house, flew up to her house and decided to put on a show--I made some flat passes. And I didn't have much time in it. I had more time in a Wildcat than in the Hellcat. The Hellcat was

about twice as heavy, and so I made a couple of flat passes and then I decided, well, I'm going to give her a real thrill, and I climbed up to about 5,000 feet and came down in a dive, and I started to pull out, and that aircraft was so much heavier that it didn't come out. It just settled, and I went between the trees on each end of the house, almost through the upstairs window.

Swent: Oh, my.

Ingle: I kept settling down, and Janet wasn't home, but her dad was, and he said, boy, the cornstalks flew in the field, and the cows raced away. I had about 500 hours, and I said, Okay, stupid, don't do that again. And I didn't do any more flat-hatting except when it was necessary, in Korea. But I think a lot of guys, they never got the second chance. So I felt that I owed it.

Anyway, then after the war, I got a job--

Flying the Bearcat, the Best Fighter Ever Built

Swent: Let's get you through the war first. You met your wife in Michigan, and then you were shipped over to--

Ingle: Then I was sent to one of the first F-8 squadrons--I mean, the Bearcat. That was a tremendous airplane. It didn't get into combat, but it should have because I've got the write-up about it, and it said that it is easily argued that it is the best fighter they ever built. And it was so fast and so maneuverable.

Swent: But actually, the war was over by then in Europe.

Ingle: Well, the war was over in the Pacific, and it was just over. But, you see, there was one squadron of VF, which was a fighter squadron, and a VBF, which was a fighter bomber squadron. There were two squadrons, one of each, and then there were two other squadrons, a torpedo squadron and a dive bomber squadron, in an air group at that time.

I started flying the Bearcats, and I went on the shakedown of the Leyte, which was a new aircraft carrier at the time. We went down to Chile for the presidential inauguration and all that. That was a real airplane. I mean, you had a little stick about that long [demonstrating], and you sat on the floor. I think the thing had a thirty-six-foot wingspan was all. It was short and stubby. Well, let me see. I've got--

Swent: You said the stick was about what, would that be fifteen inches long?

Ingle: It might only have been twelve inches.

Swent: It doesn't show on the tape, you know.

Ingle: Yes. Boy, you could do anything. You could do any aerobatic maneuver on take-off, if you were skillful enough.

Swent: How did you get down to Chile?

Ingle: Oh, well, the carrier went down for the presidential inauguration. I turned down--I had the chance to go in the regular navy, to stay in. I had two years of college, see. Well, I had three years then. So we had a choice. Because of my college training, I'm sure, I was selected as--I had a choice. The other guys, who didn't have the college training, were turned down. I turned it down, but I didn't want to turn it down until it was going to mesh with the next school year, see?

But my skipper kind of chewed me out. He said, "Well, you're using the navy for your own benefit, are you?"

And I said, "Well, I've put in my time." I said, "Okay, I'll go on this cruise."

And he said, "Oh, well, you don't have to do that."

I said, "Okay, you indicated I should, so I'll do it, and I'll lose a semester of college."

He was surprised, but I did it. Then, when the time came, I still turned it down. He said, "I thought you changed your mind."

I said, "Heck, no. I never change my mind on something like that."

Then I got in the Reserve, and so I stayed in for forty years, eight months, and five days.

Swent: How many?

Ingle: Forty years, eight months, and five days. This friend of mine--he got killed in Korea, with his own bomb because of faulty ordnance. He came up to Reno when I was still in school, and he said, "Why don't you join this Reserve outfit?"

Serving in Korea with the Naval Air Reserve

Ingle: I said okay, because I like to fly, and I liked the military flying, and so I joined up. We were one of the outstanding squadrons in the Naval Air Reserve, so we got to go first. They took six Reserve squadrons. Two of them went into an X-ray air group, where there were two Regulars and two Reserve squadrons, and then ours was all Reserves.

So we had two squadrons of Corsairs. They weren't reliable at that time. I mean, geez, they were junk. I mean, we're doing the same thing over in Yugoslavia now. Doggone it, we're not going to have any missiles left. We don't have enough airplanes. It's the same old thing, same old thing.

Swent: You're comparing the Korean engagement? That was when you were called back?

Ingle: Yes. And, you know, we had faulty rockets, faulty bombs, guns that wouldn't fire. Another guy and I were out together on a reconnaissance flight. We were supposed to be spotting for a ship, but we carried ordnance. I dropped the napalm. I mean, we got down low and saw--we could see uniforms, so we knew it was a bivouac area. There were just two of us, so I dropped the napalm and it didn't go off. We had six .50-calibers each. I came down, and I said, "Okay, we'll strafe and set it off," and none of my guns would fire. He came down. One gun out of six fired. So one gun out of twelve .50-calibers was firing. He set it off.

I got in a duel with an anti-aircraft battery on another flight. I came down, and they weren't firing, but I recognized where they were by the description given to me by a guy that had made an earlier flight. So I started firing. I opened up, and only one gun fired. And then they opened up with everything they had. I mean, that was the way it went. Like I say, bombs went off under the aircraft; bombs didn't go off. We got one batch of bombs that none of them went off. And that's what we're doing again.

So anyway--

Swent: I think we need a few more dates here. You went back--let's see--you were in the navy, and you got out of the navy and went back, then, to Mackay?

Ingle: Yes. But I didn't get out of the Reserve. We had a certain period of time, and I think it was a year, to opt to stay in. I decided I needed a little extra money, and so when we first

started leasing on the antimony mine, I was going to Oakland to fly, from southern Oregon. I would take the bus and go down and spend the weekend and come back.

Swent: That's Oakland, California.

Ingle: Yes. We flew out of Oakland. We flew F-6s, Hellcats, when I was there before Korea, and then we flew Corsairs after we came back from Korea.

Swent: Korea--that was 1950, I guess.

Ingle: Yes. Janet was in Reno, visiting her sister. I was on two weeks' active duty at El Centro with the squadron. She called me right after war was declared. She called me and she said, "The newspapers say they're going to call up the Reserves."

I said, "Don't worry about it. It will take them six months to figure out the paperwork." We had our orders in twenty-four hours.

Swent: Oh, my.

Ingle: We had forty-eight hours to quit our jobs and move out of our houses and report for duty. And then they gave us another forty-eight. But Janet had to--you know, automobiles were scarce then, and we had sold our pickup in Oregon and were looking for something else, but we didn't have anything. My landlord in Placerville knew the dealer in town.

Swent: This is Placerville, California?

Ingle: California, because that's where I was working when I got recalled. He called up Janet. And I had borrowed his car. He had a pickup, but I borrowed his car to go to the mine and help get things squared away so I could leave. Janet was pregnant then with my youngest daughter. He said, "If you can get to town by two o'clock, there's a guy coming in from out of town to buy this"--they only had one new one--and he said, "If you can get in town by two o'clock," he said he'd rather sell to somebody local.

Janet had to walk--it was hot, boy, and she had to walk clear to the mine, which was several miles. And she was pregnant. She got hold of me, and we went into town, and we got the car. Otherwise, automobiles were scarce--still scarce. And so we didn't have time to look for a used one. Ah, she was a good sport. She has been a good sport. She doesn't deserve what I've given her.

Swent: Oh-h. When were you married?

Ingle: On June 2nd--I hope I'm right!--June 2nd, 1946.

Swent: So you were still in college at that time.

Ingle: No.

Swent: In the navy, in the navy. And then you went--

Ingle: Yes, I was in the Reserve, but I was out of school because, see, when I came back, I had a year and a half to go, and things were all screwed up because the scheduling of classes--you see, they only taught certain classes every other year, and I never got one of them that I really wanted to take.

Swent: What was that?

Ingle: It was one of the geology courses. I've forgotten what it was called, but anyway, I never got that one, except that I got help from some guys that did, and they said, "This is really the essence of it," and so I graduated in 1948.

Swent: Janet was with you then at Mackay at that time?

Ingle: Yes, yes, we lived up in Poverty Flat. Well, we lived first--they had a trailer camp in Reno, down by the river. We got in there first. They had one central laundry room and bathroom. You had to hike out--at night, if you had to go, why, you had to get up and hike out there.

Swent: Did you use the G.I. Bill? [Serviceman's Readjustment Act of 1944, provided aid for college education]

Ingle: Yes. Then, after that semester, we got into an apartment up in Poverty Flat. One morning my dad and I got up at five o'clock. We were going out to look at a little mine near Winnemucca, and we got up at five o'clock. I went outside, and there was a boom, and something exploded, and the sirens started downtown, and they kept coming closer and closer. Finally, they roared up right into the yard. They had orders that if they had a call from what they called Poverty Flat, where the veterans were, that everything was supposed to roll because it was like tinder. They figured everything would go.

##

Ingle: Am I talking too long?

Swent: No, no.

Ingle: Anyway, these things keep coming back to me.

Swent: That's good.

Ingle: In fact, one interesting thing was that before I went to Korea, we had to go back to Pensacola and check out on a carrier. Janet was expecting Junie. She went to North Island on a false alarm. I came back, and I was at home a week, and I was supposed to go to Alaska to cold weather survival school. About midnight--well, I guess it was about eleven o'clock or someplace around there, her water broke, and she called the hospital at North Island, and they said, "Well, you better get over here."

She was pretty fast on delivering, and it's a good thing because she had toxemia. But anyway, the ferries only ran every half hour at that time of night. We knew what the schedule was, and so, boy, I went barreling down through San Diego, and we got aboard the ferry, and the guy that signals you when to go off the ferry--I told him--I said, "Boy, you better get me off of here or we're going to have a baby in the car." He did, and she got to the hospital fifteen minutes before she delivered.

Swent: Oh, my.

Ingle: And then I had to leave at seven o'clock in the morning, I think, to go to Alaska. We had quite a time.

Swent: Oh, dear.

Ingle: Well--.

IV INDEPENDENT MINE OPERATOR

Learning How Not to Take Samples

Swent: How did you happen to get this antimony mine? You leased it, I understand.

Ingle: Yes.

Swent: How did that come about?

Ingle: Well, I went out after I graduated--I went out to do a job for John Heiser out at Lovelock [Nevada]. There had been examinations of these various antimony mines. There were a lot of little antimony mines around Lovelock. An engineer for one of the big companies had sampled a lot of the mines and a lot of the dumps, and they needed antimony at that time, and they wanted re-sampling done--this company that was interested, with John Heiser.

Swent: What company was it?

Ingle: It was the Barite Sales Division of National Lead.

Swent: Was this an underground mine?

Ingle: There were a number of them. I sampled a number of them. One of them I had to sample a dump three times before they believed it was so bad. As a result of my sampling, the deal blew up. I mean, they were just duds. But I learned a lot about sampling on that deal.

Swent: What did you learn?

Ingle: I learned how careful you don't have to be! [laughter]

I was cutting channel samples. Gee, this geologist came in, and he said, "Oh, geez." He said, "You're sculpturing them." And

so I learned that you don't have to be as careful as I was being because the sample itself is not that good, when you're taking a small sample.

Swent: You were only sampling dumps?

Ingle: No, I sampled underground, too. But there were mercury dumps. Mercury mines had antimony in some of them. I worked with this National Lead guy, and I don't know how many mines we sampled, but I think there was only one or two that were good. What they were going to do is convert the Toulon Mill, which is a gravity flotation mill--

Swent: Toulon?

Ingle: Toulon, yes, T-o-u-l-o-n. It's out near Lovelock. They were going to convert that mill to handle antimony, until they got the results of my sampling campaign; then the thing blew up. That's when my dad told me about this antimony mine in southern Oregon. This schoolmate of mine that was a geologist--he wanted to go on a leasing deal.

A Losing Venture Leasing an Antimony Mine in 1948

Swent: What was his name?

Ingle: His name was Hank Jones. He just died about a year or two ago. He was up in Quincy [California].

Swent: Henry, I suppose.

Ingle: Yes. We went up and took a lease, and the price was way up.

Swent: What did you have to do to take a lease?

Ingle: We made [an] agreement with the owner. It had been run during the Korean War. They had mined some antimony.

Swent: Now, wait. This is only '48.

Ingle: Oh, wait a minute. It was World War II then, yes. Okay. Good you're here!

Swent: Well [chuckles].

Ingle: So anyway, we started--

Swent: Were the owners there? Were they on the property?

Ingle: No, but he lived in Medford. My dad knew him. Anyway, it looked like a possibility, and the price was way up. We started in September, I think, or something like that. I can't remember. But then John Heizer and--the National Lead guy's name was Spitzer. I can't remember what his first name was. They went to the AIME [American Institute of Mining Engineers] meeting in San Francisco. I think it was in January, but I can't remember. We talked to them because there had been a drop in price. We had a bin about half full of ore. I talked to them, and they said, oh, they just thought it was a temporary drop and the price would come back. And so okay, we kept mining.

We built a bin and filled it with ore, and the price never came back. As far as I know, that bin is still sitting there with the ore in it. It was worth several thousand dollars. But we were getting ninety dollars a month from the Veterans Administration on some government deal to help rehabilitate servicemen.

Swent: What did you do for equipment?

Ingle: The guy had an old compressor, an old gasoline compressor, and he had a little dozer. We had drilling equipment.

Swent: Where did you get that?

Ingle: We brought it in from over here in Nevada. And so we drove this drift, and we sorted the ore. The price dropped, and we went ahead and filled the bin, and then we tried to sell it. The market was dead. We left the bin full of ore sitting there. We had such a good bin, I'm sure that it stood there until--

Swent: Oh, dear. What sort of lease arrangement did you have?

Ingle: It was a percentage, but I can't remember.

Swent: A percentage of nothing?

Ingle: Yes, it turned out to be nothing. The old gasoline compressor--of course, we were mining there in the wintertime. Well, we'd get up there about seven o'clock in the morning, I think, and we'd crank that thing until ten. I mean, boy, we were so pooped by the time we got through cranking that compressor and getting it started that we could hardly get in the mine!

Helping the Neighbors

Ingle: And then we had this little dozer that went with the property. These two guys were running a little gyppo sawmill. They were across the river. I don't know--it was several miles we had to walk the cat [cletrack dozer]. We made a deal with them that we would move the sawdust that was stacking up in their way if they would give us enough timber to put in the mine.

And so we walked that sorry little dozer across the river and over to their sawmill and did the work and went back and followed the road that we had come over on, and picked up pieces of that little dozer. Those guys were as hard up as we were. They were living in a shack. They were each married. They were brothers. One of them at least had a baby. One of them had a rough-board house, and one of them was living in a tent, I think. They were bound and determined that they were going to make a go of that little sawmill, as we were with the little mine.

Anyway, we had to pick up all the pieces of the dozer, and they moved the dozer to the mine for us, and they had only a ton-and-a-half truck, and the doggone dozer weighed six or eight tons. I said, "You can't haul it on that."

They said, "We're hungry. We can haul it." And they blew a tire right off the bat, but they did get it up there. I mean, things were done that way in those days. I don't know. The Bible says no man starts to build a tower unless he can figure he can finish it. Well, geez, you know, we couldn't finish anything in those days!

Swent: Did you have your family up there, too?

Ingle: Yes. See, that was before Junie was born. We lived in a little two-room cabin in acamp. It was a summer camp, really. My partner had a trailer, a little house trailer, you know. He had a daughter then, and Janet had my oldest daughter. The ice would freeze in the sink in the kitchen at night. We finally got a little kerosene heater. It was terrible.

We had a pickup then, but we would take his coupe up to the mine, but we would have to heat it in the morning. One morning we caught the engine on fire and thought we were going to lose it because we were trying to melt the ice in the fuel line. But, you know, there were some--so I say, Janet has been a good sport.

We did some work for my father then. But then I got a job at Volo Mining in Placerville.

Volo Mining Company: Shares, a Meager Salary, and Poor Samples

Swent: How did that come about?

Ingle: Let me see. Somewhere or another, I got word of it, and I went down to see the guy. I can't remember whether this friend of mine, Johnny Wells--he knew the metallurgist there, and he may have had something to do with it. But anyway, we moved everything down in the pickup, and I went to work for them. I was supposed to be on shares, with a meager salary. Our big deal was every Sunday morning we'd get some doughnuts. That was the guy that knew the auto dealer in Placerville. I had been there, oh--I'm not sure whether it was a year or year and a half. But anyway--

Swent: What were you doing there?

Ingle: I was doing the engineering and anything that had to be done. Oh, and [chuckles] "lessons learned, equipment used": we had a gasoline power shovel, and it didn't have a brake. You could only swing the thing one way because there was only a brake to stop it in one direction. I ran it a little bit, but not very much. Anyway, you had to dump the bucket as you approached the truck so that it would drop in the truck because you couldn't stop it.

Swent: That took some skill. [laughter]

Ingle: Anyway, it was an interesting job.

Swent: What were they mining?

Ingle: They were mining gold. But, you see, it was a wide dike, maybe fifty feet wide, something like that, maybe more. But anyway, on the contacts of the dike with the country rock, these little pockets would show up. It had been mined with little dog-holes along the contact. Well, these guys were trying to mine all of it. Of course, it wasn't good enough grade. They had a good mill. I mean, geez, it had flotation, it had gravity, and it had cyanide.

We started working there, and then we got over this mine--or the owner, the guy that was the promoter was Forrest Phillips. He was a nice guy, and he was honest, and he was putting his own money in. But he was also putting somebody else's in. He would not pay attention to--he said, "Well, you can't tell what it will run until we put it through the mill."

Well, I told him, "Then you might as well not put it through the mill because you're going to go broke."

We got a chance to get this mine that John Mackay had had. It was up in Sly Park. I can't remember the name of it. We hired Johnny Wells, who was to become BLM's placer expert for the United States. He was working for Natomas. Of course, the dredging business folded, pretty much. I guess--no, it was before he went to work for Natomas that he came there. He and I worked together.

Well, they brought some dump trucks and a power shovel up to load ore at this mine.

Swent: The Mackay one?

Ingle: This was Volo Mining Company, but it was this mine at Sly Park. I can't remember the name of it. It rained before the trucks could get out of there, and then they couldn't get out. Johnny and I--they had depicted the geology as the ore was lying on the side of this hill, see? So we got hold of a map. I don't know how we got hold of it. But anyway, it showed that the ore didn't dip that way. It dipped into the hill, which made it impossible to mine because of the overburden.

We had assay maps of the mine, these cross-cuts, and so we said, "Well, if the geology is wrong, then maybe the assays are wrong." Of course, our immediate boss, who was the promoter--like I say, he was an honest one, but he didn't have the knowledge that he should have had. We talked about cutting samples. He didn't want us to, but we went ahead anyway and cut samples all through these cross-cuts, and there were numbers of them.

We sent in the samples. They were duds. There was nothing in it. I mean, and these other assays had shown good values. It could have been mined. So that blew that thing. The guy that was putting up the money said, "Well, I know where we can get road rock closer to the mill." [laughter]

Swent: Had the samples been salted before, do you think?

Ingle: Oh, they must have been. Maybe not salted, but maybe the assays were--maybe there weren't even assays; somebody wrote figures in. I don't know. But they could have been salted. But anyway, then I got my orders shortly after that. I told this guy--I said, "Some of the other properties"--and one of them was the Natomas tailings pond. I sampled that. I figured out a way to sample it. I told him--I said what it was going to run--this guy had set up a little plant. This other guy was promoting it. He claimed all kinds of value for it. It was the black sand from the dredges. But it had been through the Natomas sampling plant.

I sampled it. I worked out a way where we could do it with the water in it and everything. And we got nothing. I told them what they were going to get, what my assays showed. After I left and went to Korea, or went into training, they ran it. They hauled it up to Placerville, and it went just what I told them it would go.

There was another property that--I did a little sampling just before I left, and I said, "It's not going to go." Well, they mined it, and it didn't go, either. So when I came back from Korea, this promoter--the one that had put his money in--he wanted me to come back and run the thing for him. I decided it wasn't going to go. He had had a good mine, but he didn't hang onto it.

He said, "Well, there's a little copper property." They were ready to ship ore. I went out and looked at it, and the shaft was still full of water. No head frame and no nothing.

Swent: Where was that?

Ingle: I can't remember, but it was close to Placerville.

Swent: Copper?

Ingle: Yes.

Swent: Copperopolis, maybe?

Ingle: No, no. I did some work down there, too, for Natomas. But this was just a little shaft. They couldn't have been shipping ore for six months. I figured, well, geez, the guy's a dreamer. I was a dreamer, too, but--

Swent: But you have to have something to--

Ingle: Yes.

Swent: You spoke of your sampling. Did you send the samples to an assayer?

Ingle: Yes, yes.

Swent: Where did you have them assayed?

Ingle: I am not sure, but it could have been--I'm not sure whether it was Martin Quist or not, but he had an assay office in San Francisco, and we dealt with him for a number of years. He's the one that called me about the Corona, you know.

Swent: Yes, he did a lot of mercury work.

Ingle: Yes. So it could have been him, but I can't remember for sure.

Swent: But you didn't try to do your own assaying.

Ingle: No, not then.

Swent: You were sure that the assays were okay. You could trust the assays?

Ingle: Oh, yes, yes. And then if I had a question--sometimes, you know, you would judge a little bit about what you thought it would run, and if it didn't come close to that, then I would call them and they would run it again. Sometimes there was an error because a lot of the samples I panned, and so I would judge where they were going to be, where they ought to fall. And some of them were just out of line, but then they would run them again for you.

Swent: You mentioned that you checked a map and that mine--it would have been impossible to mine because of the overburden, but it was an underground mine?

Ingle: It had been. I mean, Mackay--they had these cross-cuts and drifts.

Swent: They were planning to do an open pit, then?

Ingle: They were planning--see, it was another steep--like the Corona--a steep hillside, and they had a little--I think a two-stamp mill there; they had run a little bit, and they had stoped a little bit. There were some values, but they weren't widespread enough. And then, you see, if they had been right, it would have been a slab on the side of the hill, but it dipped into the hill, so you would be getting too much overburden too fast, so that it wasn't feasible.

Swent: I see. I just wanted to clarify that a little bit.

Ingle: Yes. So anyway, then I went into service.

Swent: What did Janet do while you were in Korea?

Ingle: She stayed in San Diego.

Swent: With two children?

Ingle: Yes. Her grandmother was with her, and then her sister was with her, too, while I was overseas. That old refrigerator that's sitting in the garage?

Swent: Yes.

Ingle: We made a deal to have a house built down there, and we got a deal on the refrigerator because they were going to build a house in this subdivision, and then we got a rumor that we were going to be moved back to Alameda, and so we dropped the house idea, but we never did move back to Alameda. But we had bought the refrigerator, and that is the refrigerator that's out there in the garage, that's still running! Let's see, it's--

Swent: Almost fifty years.

Ingle: Yes.

Swent: What brand is it? I'd like to know.

Ingle: It's a GE, I think.

Swent: Good enough.

Ingle: Of course, we've had a Maytag washer for--or is it the dryer we've had since almost that long? Some of these appliances today--you know, they're built to throw them out in a couple of years.

Swent: That's right.

Ingle: We kind of enjoy talking to the people down here that sell appliances. They say, "Well, how old is that?"

The relevance to mining career on this military service: I went into a Japanese coal mine while I was on R & R [rest and recreation] one time at Sasebo, which was the alternate target for the atom bomb that was put on Hiroshima, I was told. These two Japanese guys took me through, and, boy, you had to bend over and almost have your chin between your knees to get through part of it. It was--

##

Ingle: Only two of them were working in the mine, but they took me through and showed me what I wanted to see. And then also it was interesting to note that outside the mine there was a guy breaking road rock--with a hammer.

Swent: You knew all about that. [laughter]

Ingle: Yes. But then the other thing was that, you know, in Korea they produced a lot of tungsten. There was one deep canyon that we used to fly below the rim, and I would study all these mills and things, the relics of them that were there that hadn't been destroyed by the North Koreans. It was really kind of fascinating. But the only thing was that once they put anti-aircraft guns on the top of the ridges, it wasn't so healthy then. But anyway, it didn't dim my love for mining.

Setting Grade Stakes for the Highway Department

Swent: Or flying.

Ingle: Or flying, yes. So then--okay--I worked for the state of California. I came back, and there weren't any mining jobs available immediately. Of course, I had to go to work right away, and so I went to work for the California Highway Department. This other guy and I set a record one Saturday on setting grade stakes. Most of the people--they didn't make much effort, but this guy, he was eager, like I was, and we went through. The engineer in charge of the project wrote us up for that.

Swent: Where was this?

Ingle: It was down out of Salinas. But, you know, I liked to work and accomplish something. That's the way I was taught.

Swent: How much were you paid by the Highway Department at that point? Do you remember?

Ingle: I can't remember. I can't remember. It wasn't very much, but I can't remember.

Swent: And your family was living in Salinas?

Ingle: Salinas, yes.

V TAYLOR-KNAPP MANGANESE MINE, 1952 TO 1957

Engineer to Superintendent

Ingle: When I had been in Korea, I read about this mine that T-K Mines was opening, this manganese mine in Tracy.

Swent: How did you read about it?

Ingle: One of the magazines had an article. I don't know whether it was *E & MJ* or--the forerunner of *SME*.

Swent: *Mining World*?

Ingle: No. Well, it could have been. I'm not sure. I'm not sure which one it was. But anyway, they had pictures of it, and I thought, boy, that looks like it would be fun to work there.

Swent: Excuse me. I want to interrupt for just a minute. When did you join the AIME [American Institute of Mining, Metallurgical, and Petroleum Engineers]? At Mackay, as an undergraduate?

Ingle: Yes. In fact, two years ago, I think, I had fifty years. And they were supposed to give you a free magazine after that, but they changed the rules just before then.

Swent: Really? That's too bad.

Ingle: Except that I think they cut the price in half.

Swent: You got a lapel pin, anyway.

Ingle: Yes.

Swent: So even over in Korea you were reading the mining magazines.

Ingle: Oh, yes, yes, yes. And that one looked like it would be kind of nice, and they had pictures of it.

Swent: What kind of mine was it?

Ingle: Manganese. It was battery-grade manganese.

Swent: And where was this?

Ingle: In Tracy. Just out of Tracy, California. They had a mill that had gravity and magnetic separation. I went on as a junior engineer, and then they promoted me and promoted me, and I was general superintendent when they shut down, and I was supposed to take over as manager, but they shut down. The sad part of it was that they had taken I think six carloads or eight carloads up to their Montana mine. They had a battery-grade mine in Montana. There were only two places in the U.S. that could produce battery grade. One of them was Tracy, and the other was in Philipsburg, Montana.

You couldn't tell, unless you made a shelf check--made some batteries and put them on the shelf for a certain period of time--you couldn't tell whether they were going to be good or not. Well, Tracy turned out to be good, and they took six or eight cars, railroad cars, and sent them up to their plant in Montana and ran them through, and they came out good.

Then we started mining--well, they had a little open pit. Rather, it was kind of an open cut, really. But then they had to go underground. They found out that as they got to the peripheries of this ore body, the metallurgy changed. They had tests run, and they found that, to get good recovery, they would have to grind to 3000 mesh. That was impossible.

It was there that [chuckles] the state mine inspector--I wasn't there, but the mine foreman went with him. He walked underground, and he said, "Well, you'll have to timber all these drifts and cross-cuts." The foreman was--we got to be real good friends. He had almost quit when I started there. But he said, "Well, if they had needed timber," he said, "I'd have thought they'd have put it in." I mean, it had been standing open since the 1860s.

He said, "Well, I'm sorry, but you'll have to timber it all." So then they went down to the lower level, and he went in, and he said, "Oh, you'll have to timber all this, too."

The foreman says, "Well, the U.S. Bureau of Mines drove this drift, and if they'd have needed timber, I think they'd have put it in."

And he said, "Well, okay, I'll let you use your own judgment." They never put a stick of timber in it.

But there was one bad deal in there. Rupert Mock was the foreman, and I said, "Rupe, did he say anything about that?" There was this open stope, and it rolled over, and up where it rolled there was some timber caught in a bunch of boulders. It was right above where the guy was running the mucking machine. I said, "Did he say anything about that?"

And he said, "No, he wasn't smart enough." [chuckles]

I said, "Well, we better do something about it anyway."

But anyway, we--let's see. We worked there--I don't know. Was I there five years? I can't remember. Well, anyway, after we shut the plant down--

Swent: I think so: '52 to '57, I think.

Careful Control of the Grade of Concentrates Shipped

Ingle: Yes, okay. We tried shipping on the car lot program, the government buying the manganese. We found out that if we lowered the grade of manganese--see, the battery grade was okay. We had to blend real carefully. The assayer there was really good at blending. We were shipping in boxcars. And so he would fill both ends of the car and then the middle and then he would save a few tons to get the grade--see, it had to be 42 percent, I think, of manganese oxide or dioxide--I can't remember. But it had to be 42 percent, I think.

They wouldn't pay you if you had better grade than that, but they would deduct if you had less than that. So he made it a point--on his own, he made it a point to skin that down to about 42.1 or something like that. This was his own exercise. They couldn't figure out--the consumers couldn't figure out how he could come so close for so long. But, see, we had magnetic separators, and you drew off, I think--I can't remember--four or six products. You would assay each bin. The magnetic separators--one of them had finer material than the other one, so they were

different grades. That made about eight bins, anyway, and then we had table con[centrator]s for gravity.

He would work all these things out so that the last ton or two he put in would just barely make the grade. I had to fill in for him when he went on vacation, and so I learned how to do it, too.

Then--oh, also there was only one assayer in the country that knew how to assay manganese. See, it was hydrosopic. If you let it cool--if you weighed out your sample and let it cool, then it would pick up moisture, as soon as it got--I don't know what temperature, but anyway, as soon as it got cool, it would pick up moisture, and so therefore the grade would be lower.

This LeDoux & Company in New York--they were the only ones that knew that, see, and so we would send all our assays to them. That was one of the things that you had to do. And the blending. See, when we shipped on the car lot program, we couldn't make any money in later years because of the fine grind we had to have. When we started shipping on the government car lot program, well, we found out that if you shipped them--I can't remember what the grade was, but we started shipping them I think 42 percent--I'm not sure of that.

But anyway, then we ran some tests, and we found out if we made a lower-grade concentrate, see, and shipped it to them, they would get--the overall recovery would be better, see, because they got a lower-grade concentrate, but then they'd make better recovery on that than we could by trying to hold--

Well, we shipped that way, and then they ran some more tests, and they found out that they wouldn't get as good recovery, any more than we did. And so then that just about finished it.

Then Taylor-Knapp, T-K Mines was done. We had the metallurgical problem, and we had ponds of lower-grade material, but we couldn't get the grade up, and so we had to shut down. Then I ran a lab for them for a year. They made a deal with me on the mercury mine. But I ran a lab then on the Philipsburg ore because when they went to depth, they didn't have the oxide, so it wasn't battery grade any more. But they had rhodochrosite, I think it was--and I might be wrong on that, but anyway, it was--oh, I can't remember what the chemical formula for rhodochrosite was, but there was a lot of silver in it. They could mine that.

An Ingenious Rebuild of a Pump to Dewater a Shaft

Swent: At the same place?

Ingle: Yes. I went up there one summer and put a 450-horsepower submersible pump in, and, boy, that was--they couldn't get the lengths of pipe down the shaft and onto the station where we had to lower the pump. They had to cut the pipe in half. They had this outfit in Wyoming that handled a lot of oil well stuff. They had them cut the pipe and rethread it. I was running the night shift when the pump came down, and we had to cinch the first section of pipe onto it. We tried.

We used a tremendous length of cheater on it, to try to get--the specifications called for--you would only leave two or three threads showing. If you understand--when you've got the pipe cinched up to where it should be. Otherwise, the threads might not hold that 450-horsepower pump. The engineer had rigged up a cart with a load on it that ran up and down the dump. This was a safety device. We put bolts in the sides of the pump so that if the threads did fail, this go-cart had enough weight to keep the pump from going clear down to the bottom of the shaft.

Well, anyway--

Swent: You were pumping water out of the shaft?

Ingle: We were going to pump water, yes. I was running the night shift. We couldn't come close to getting the threads down to what they should have been, and so I sent word down to the engineer and the superintendent. I said, "We're not getting the threads down like we should. What do you want to do?"

They said, "Hold it up till morning. We'll check it out in the morning." We found out that this company that had cut the threads--and, I mean, they were a big outfit--had gotten the pitch of the threads wrong. There was no way you could get that pipe to come together.

It was kind of funny. We started out--because these threads were supposed to be so fragile, so to speak, that you had to be careful when you took them apart. What we were going to do was take off the couplings that had been put on by this pipe company, and then we were going to weld one end of the pipe that had the bad threads--we were going to weld those ends in, see?

So we started very gingerly. Boy, I'm telling you, by the time we got done, we were using double jacks and everything, and

we couldn't get them loose. So we sent them over to Anaconda, to their shop, and they broke their machine trying to get them loose.

Swent: Oh, my.

Ingle: What we had to do was--we left the couplings on, and the other ends we had to weld the couplings, and we put straps on them, between the coupling and the pipe, and that's the way we had to hold them in.

Swent: You forgot the threads completely, right?

Ingle: Yes. Except, you see, the threads they came with were okay, and so we used those. That's what we screwed on. But on the other end, we welded it. But, you see, we were delayed three weeks in getting that shaft unwatered.

Swent: This was up at Philipsburg?

Ingle: Yes, this was at Philipsburg, the same outfit. They built a sintering plant up there and everything.

Swent: Sometimes you have to invent your own way around things, don't you?

Ingle: That's the thing. And I'm afraid we're going to lose that because these big companies, you've got to goose-step for them. You can't make decisions like that without the whole hierarchy standing around, figuring it out. So we lose something.

Swent: Where was this lab that you were going to--

Ingle: It was in Tracy. It was out at the mill.

Swent: The lab was at Tracy.

Ingle: Yes, it was out at the mill. I ran--geez, I don't remember--several hundred tests with flotation because they were going to put a flotation mill in, up there in Philipsburg, and they wanted me to come up and run it. But they weren't going to give me a free hand. What the chief engineer wanted to do was make it a separate entity, the metallurgical department. The mine manager up there wouldn't have it, so I said, "Well, okay. I've got better plans."

Swent: But you were the manager at Tracy.

Ingle: Yes. I mean, after they shut down, I was scheduled to be manager.

Swent: I see.

Ingle: Well, I'll tell you what I forgot. They had a contract with the government. We stripped this ore body, and we were going to make an open pit. That was economically feasible. I was supposed to come back after the summer and be the manager there. Then the government cancelled the contract. And so we had the pit stripped, but no place to go with it. Anyway, things like that happened all the time.

I see you were wondering about labor relations. You were asking there for the Corona Mine?

Swent: And T-K also, anywhere.

Ingle: We had no--well, we did, too. I shouldn't say that. When I went to work at Tracy, the mill superintendent thought I was after his job, and I was not. But that affected--this assayer also thought that I was after the mill superintendent's job. They were friends. I told them later--I said, "No, I didn't have any idea." I mean, I didn't know what was going on. But then we did have a foreman at the mill. They finally forced him out because he said, "Well, it's going to be my way or nothing." So they said, "Well, okay, we'll see you."

And then at the mine--I can't remember what happened, but this one guy got to thinking he was indispensable because--I can't remember why the foreman wasn't there. But anyway, I finally had to let him go. But, I mean, we didn't have any real labor problems, you know? Not like we had later in Arizona.

Swent: You weren't unionized?

Ingle: What?

Swent: No union.

Al Taylor Believed in Honesty

Ingle: No. One thing: this Al Taylor. He influenced me a great deal. I mean, we had a little gyppo outfit. A guy had one truck and a loader. We only ran a hundred tons a day through that mill, twenty-four hours. This young guy and his dad were handling the hauling and the loading at the mine. He wanted to get a contract. I said, "Okay, what will you do the job for?" He gave me a

figure--I don't remember what it was-- and I was kind of elated because it was so low.

I went in to Al Taylor--he was the vice president, and he was managing the deal there. I said, "Geez, you know, this sounds like a good contract."

He looked at it, and he said, "No, it isn't." He said, "That guy can't do it for that price. It's too low." He said, "We'll give him a contract, but we'll pay him this many dollars." He said, "If we give him a contract at that price, he'll go broke, and then the next people that come in, 'Well, what happened to the last guy?' 'Well, he went broke.'" He said, "Everybody's got to make some money. If they don't, it's not going to hold together."

I learned from that, and I always remembered it. Al Taylor was a real swell guy. He believed in honesty when you didn't have to be honest. It was a good little outfit to work for. I picked up some things from various people. I tried to remember them and what they said. And I picked up a lot of things on operating and interpreting maps and things like that.

I remember one thing in particular.

VI MORE ABOUT THE CORONA MINE OPERATION

[Interview 3: April 6, 1999] ##

A Mine That Appealed Because of Its Problems

Swent: Yesterday, when we stopped, we had pretty well finished with T-K [Taylor-Knapp], I think, and were just about ready to go to the Corona.

Ingle: Well, let's see. We covered that in that other--

Swent: Well, we talked about your processing, but I don't think we ever mentioned the mining, really. And you never told how you happened to be there.

Ingle: Actually, a friend of mine--a friend of his bought a little ranch up in that area, and it had an old mercury mine on it. I researched the mercury, and I got interested in other properties. I never discovered which one was his, but I found--

Swent: Who was he? What was his name?

Ingle: Well, Tom Rowland was the man I knew from high school days. I didn't find the property that I was looking for, but I read about the Corona Mine. It appealed to me because I felt if you wanted to find a mine that had reserves almost in sight or easily found, you had to have a metallurgical problem or a mining problem or a marketing problem. The Corona filled the bill. I mean, it had a metallurgical problem. Of course, it had had a marketing problem. They had not been successful in solving the metallurgical problem.

Swent: Excuse me. What was the marketing problem?

Ingle: The price had gone down, see, and that had shut it down, and the price was up when I was looking, so they had made several attempts to operate the mine, and they had all been failures. As John said, every board meeting, they asked for more money.

Swent: This is John Livermore.

Ingle: Yes.

Swent: Had he been on the board?

Ingle: No, no. I found out who the owners were.

Swent: Who were they?

Ingle: It was Vallejo Quicksilver.

Swent: That's right.

Ingle: Don Emerson was my real contact, although I got to know all the people involved. We started out--the Taylor-Knapp Company--it was T-K Mines, really, but the Montana operation operated under Taylor-Knapp Company. At that time, they had the greatest longevity of any 100-ton-a-day mining operation in the United States. Al Taylor took an interest in the Corona from what I told him, so they were going to put up the money to open up the mine. They thought it looked good.

We applied for a DMEA loan, which we got virtual approval on, but Al Taylor had a heart attack while he was at the Corona, and that kind of put him on the shelf. The other couple of partners were not really interested in going into another property. The chief engineer later told me--he said we should have; we could have made a good deal out of it. I didn't figure there was any reason to argue with them and to try to change their minds. They seemed to be adamant. We had this DMEA loan, which we had to cancel.

I had done all the figuring on it. Al told me--he said, "That looks good. Now double the costs." I've learned from that that you never--well, you hardly ever can come within the budget unless you add a great deal to it because in opening an old mine, you never know what you're going to find, so you have to make allowances for that. But the DMEA people were enthusiastic and thought it was a good deal. I didn't get final approval, but I did get the field team's approval.

Swent: What is DMEA?

Ingle: Defense Minerals Exploration Administration, I think it was. This was mercury. They liked it in those days.

Swent: A strategic mineral.

Ingle: Yes. So anyway, then it took me--I hung onto the property. I did consulting work, and I did assessment work every year, which kept the lease valid. But it took ten years before we were able to get the--Taylor-Knapp opened up this one level, so I had the entry to the mine. We didn't have any furnace or anything; we didn't even have a retort. I used to go up there on weekends every time I had a chance otherwise, and do the work.

Swent: Now, in those days, what did closing a mine involve? The people who had stopped mining before, the Vallejo Quicksilver people--how had they left the mine?

Ingle: There was one entry through a little open pit. You had to crawl down and shimmy down an old air pipe.

Swent: This was an actual metal pipe?

Ingle: Yes. It had been an air pipe. The chief geologist for--I can't remember the name of--it was a copper company over in Ely [Nevada]. The chief geologist liked it, and he had some experience in mercury. He and I decided to go in, shimmy down this pipe and go underground to see what it was like. It was raining, and there was a big boulder hanging over the opening that we went down. We got down into this large stope for a small mine. There was something that fell, a big boulder or something, and we weren't sure whether it was the one that could close the entrance.

Swent: Whew!

Ingle: So we scrambled back out. But we did get a look, and we could see beyond the cave, at the portal.

Swent: By "cave" you mean it had caved in and closed the portal?

Ingle: Yes. Then Taylor-Knapp--they got interested, and we opened that portal. And then Al had the heart attack.

Swent: How did you open it?

Ingle: By hand. Pick and shovel--and wheelbarrow.

Swent: It's on a steep hill.

Ingle: Yes, but it had a good place for dumping. Eventually, we put an ore bin there and we built the furnace plant. We bought the little furnace from Wilbur Springs, which was about sixty miles away, I guess.

Swent: You had talked about that before.

Ingle: Yes.

Swent: Getting that furnace up there.

Ingle: Yes. That was a real chore. See, by that time, Hughie and Dick were--Hughie was nine, probably, and so he was a lot of help. Dick wanted to play baseball. I didn't get him out there too much. If they didn't want to go, they didn't have to go.

Swent: Dick is older than Hughie?

Ingle: No, Dick is younger than Hughie. So anyway, we did everything by hand. We were able to buy this old loader, which we still have. It had to be repaired. We had to overhaul the engine. Universal Silvers--owed me some back wages, and so I got some lumber from them for the bins. It was old, dried-out lumber. Dick and Hughie--especially Hughie--got broken in on Japanese nails because they bent with this hard timber, and I don't know how many extra nails they had to put in.

Swent: Were they actually made in Japan?

Ingle: Yes. They were a softer steel than the U.S. stuff, and the wood was real hard. But anyway, we put together what you saw.

Swent: There was one part of the tape that didn't work on that other interview, where you were telling about getting--was it telephone poles that you got?

Ingle: Oh, yes. Old power poles, yes. And we built that wall.

Swent: Retaining wall.

Ingle: Yes, retaining wall. Then we used cross arms to make--

Swent: Cross arms?

Ingle: Yes, from the power poles to build the roof over the furnace. You know, on a power pole you have the arms that hold the insulators.

Swent: I didn't know what they were called. All right, cross arms. So you used those for the roof.

Ingle: Yes. And we got--I don't remember--I think we got--most of the corrugated iron we may have gotten from--what the heck was the name of the mine at Crater Lake? It was well known. I can't think of it right now.

Swent: Oh, up in Oregon?

Ingle: No, at--I don't mean Crater Lake. I mean Clear Lake.

Swent: Oh, Sulphur Bank?

Ingle: Sulphur Bank. And we got the stainless steel condensers, and we got the hoeing machine. Then we virtually sold the hoeing machine. They kind of broke a gear in it, so they wanted to turn it back, and we took it back, and then it cost us, I think, \$500 for the gear, though. Janet did the hoeing up to the time we were able to get that fixed.

Good People to Work With

Ingle: We opened up the mine, and then we were negotiating for an Atlas-Copco compressor. The Atlas-Copco dealer down in the Bay Area knew what we were doing, and he wanted to sell me that compressor, which was about new then. We still have it. I wouldn't buy it until I had the money. He said, "Well, that's why we're willing to sell it to you."

You know, we had some real good people that we worked with. One of them, we still work with him. I just sent him a check yesterday, at Bayside Equipment. We got help from a lot of people that were interested. We got the plant set up, and I was going away on consulting work.

Swent: Excuse me. You had moved by now from Tracy up to--

Ingle: Oh, yes. We moved first the year when I went to work for Taylor-Knapp or T-K Mines. We got the furnace all ready to go, and we had to use the condenser system that came with the furnace, to start with. It was a way too short. And then we had the metallurgical problem which I mentioned before, yes.

Then this friend from Atlas-Copco--he called up and said he had two miners from the New Almaden. New Idria had taken over the New Almaden at that time. It had been run by New Almaden--they called it New Almaden Partners or something like that. They were --well, Jimmy Schneider was the one that I worked with. He was overseeing it.

This Atlas-Copco dealer called me up, and he said these two guys had been leasing at New Almaden, and they were out of there then because of the take-over. He said they were wondering if we could give them a lease. So we worked out a deal, and they came

up. They worked for, oh, two or three months. I showed them where they could put a cross-cut in.

Two Lessees Join the Effort

Ingle: At the end of that time--well, the geology was not what I had figured. There was an upper stope that had a pretty much vertical wall. I thought that it was going to go down to where this cross-cut would intersect. Well, instead, the silica carbonate made a roll, and they went--instead of going about fifteen or twenty feet, they had to go about forty or fifty feet. They came, and they said, "Well, we've got to quit. We're out of money." They had intersected about, oh, a twenty-foot area of what was really ore grade.

I said, "Well, you ought to at least long-hole there." They put out a long hole about, oh, sixty feet or eighty feet, and it was all in ore. And so then they mined that ore body. Every once in a while, they would hit a blank. You know, they would think they were done, and I would go up and say, "Well, here's a place that looks like there's possibilities," and so they would shoot a round or so, and there would be ore again. So that went on for, oh, several months.

And then they had this ore body that they had originally worked on. They wanted to quit again. They had made, oh, \$22,000 in six months or something, which was pretty good money in the 1960s. They had a layer of clay in the bottom of this stope. I said, "Well, you ought to at least go through that clay because there could be high grade on the other side of it."

Well, they would have to underhand, and it was going to be below the level, and so I thought, well--

Swent: They would have to underhand?

Ingle: Yes.

Father, Mother, and Son Double Production

Swent: Dig down.

Ingle: Yes. So they didn't want to--they weren't working too hard. And so I thought, well, Hughie and I might as well do that and see what's below that clay. Well, the clay was maybe four to six inches thick, and below it was high grade. We took out--we doubled the amount of ore from that stope. And we didn't have to underhand. We had just to shoot only the hard spots, and then we double-slushed it.

When these guys were in there, we set up a slusher. They didn't have to load anything by hand, but we didn't have to, either. We just double-slushed and pulled it up a ramp and loaded the car that way.

Swent: I'm not sure what double-slushing is. I know what a slusher is, but--

Ingle: It meant that we had the slusher set up in a little drift here--

Swent: A slusher is like scoop shovels.

Ingle: Yes, double-drum winch, yes. And so we had the slusher set up in, say, this cross cut here [demonstrating], and then the ore body was out here [demonstrating], but it turned and came back. And so double-slushing--we slushed it this way [demonstrating], till we got a pile of ore, and then we slushed it back up the ramp and filled the car.

Swent: Slushed it twice, in other words.

Ingle: Yes. We didn't have to do any underhand. We had some real good ore.

Swent: And you had it all to yourselves.

Ingle: Yes. And then we would run the furnace for ten days a month. Hughie was--ah, shoot. He was in high school then. We were working one night. We would get the furnace going. It took two guys to run the furnace. We would get it going, and then we would mine as fast as we could to get another day or two's run on the furnace before we shut down.

This one night, we were working at about five o'clock in the morning. We had gotten out--I forgot how many cars. Hughie had trammed them all. He said, "Well, let's get three or four more cars, and that will be a record." See, he was still going at five o'clock in the morning. So we did. But that was the way we worked. We figured to run the furnace. Once we started the furnace, we had to keep it going twenty-four hours, so we would run it ten days.

Janet and I ran it to start with. Then we built up. We didn't have a retort, so after we hoed it, we put the sludge from the condensers in the barrels and saved it. And then, when we got the retort built, then we really started making production.

Swent: That's where the wine barrels came into the picture, right?

Ingle: Well, that was at the end of the condensing system, that wine barrel was. And we had this stainless steel manifold that we had gotten from Sulphur Bank and a lot of other stainless steel, so that we had twice the condenser capacity that you would normally have on a plant like that. But because we had this metallurgical problem, it captured a lot more mercury. It was worthwhile. Like I said, we overcame most of the metallurgical problem by raising the temperature about a hundred degrees.

Anyway, we had a lot of fun. We had a bobtail dump truck. Well, we had two of them, that I got from the county at a sale. We paid--we only wanted one of them, but we had to take two of them. We got them for about \$200 apiece.

Swent: Were you just doing this in the summer, because Hughie was in school in the winter, wasn't he?

Ingle: Well, yes, but he would go out on weekends and after school. We didn't like to work on Sunday, but sometimes we had to. He was a tremendous help.

We finally got a roof. At first we only had just the roof over the furnace. I mean, the roof was about six feet wide or something. The only place you could get out of the rain then was to sit alongside the furnace. By the time we got everything set and the government shut us down, we had everything comfortable then. I mean, they shut down the market.

We did some long-holing in there, and we were quite successful. At one time--I may have mentioned this before, but I was panning the samples and assaying them. We would hit high grade, and then we would lose the water and we couldn't drill any further. Well, on this one thing, there was just a little bit of high grade showing in the end of the hole, the very end of the hole. But it looked good, and so the two lessees drove a cross-cut out to the contact with the sediments, and they didn't find anything.

I went up one afternoon, and I said, "Well, you're too low. You're just a few feet too low, and you missed the ore, if there is any." It was late in the afternoon, and they said, "Well, let's go up and drill a couple of holes and see whether it's

there." I started them so that I knew that the hole would not reach the ore, and then I moved them to the next hole, and it was in a real black silica carbonate. A lot of it was green and a different color, but I said, "You don't have the right color silica carbonate in that hole."

And so we moved and started to drill the next hole. They got up about six feet above the back of the cross-cut, and I said, "Okay, now there's the black silica carbonate." And all of a sudden, the cuttings turned blood red.

This one guy says, "I don't believe it. I don't believe it." See, it was that close. We were that close, and there was no sign of the high grade.

Swent: What kind of drill were you using?

Ingle: A big Atlas-Copco jack-leg drill.

Swent: With compressed air?

Ingle: Yes. We had that Atlas-Copco--well, we didn't have it at first. But after those guys came and we hit the ore the first time, then I said, okay, we'll take the compressor. But it was a hand-to-mouth deal in the beginning.

##

Swent: You said it was a hand-to-mouth deal, but you kept it going.

Ingle: Yes. We finally got all our bills paid and were selling through the Sonoma International, because I was doing consulting work for them on one of their little mines up in Trinity County.



Lt. Hugh C. Ingle, Jr., USNR, in Korea, 1951.



Captain Hugh C. Ingle, Jr., USNR, circa 1972.



The Ingle children, 1991: Richard, Joyce Lynn, June, and Hugh Calvin.



Janet and Hugh Ingle's family, fiftieth wedding anniversary, June 2, 1996.



Hugh, "Hughie", and Janet Ingle, 1996.



Corona Mine rotary furnace and sleeping quarters behind, 1998.



Corona Mine D Retort, 1998, with retaining wall of reclaimed telephone poles.



Hugh Ingle operating the hoist at the Corona Mine decline, November 1998.

VII CONSULTING WORK ON MERCURY FOR SURE MONEY

Directing Exploration at the Helen Mine

Swent: We want to talk about these consulting things you were doing at the same time.

Ingle: Well, yes. I would take off because the consulting money was sure money, and I was paid pretty well for the work. I did a lot of consulting work on the mercury.

Swent: What sort of thing did this involve?

Ingle: It partly involved management and going and examining these mines and evaluating them on their worth--I mean, my judgment of their worth.

Swent: Do you think we should pick a specific example? What were some that you were doing at that time?

Ingle: The Helen Mine was one of them.

Swent: That was nearby.

Ingle: Yes. I would go up there one day a week and get them lined out. The man that was in charge of the operation--he was just there on some weekends. I was kind of directing the exploration. There wasn't much good ore showing when I went up there, and so I suggested that they drift on this one showing. Fortunately, they hit high-grade ore. The man that was in charge--he was the chief geologist for Southern Pacific at that time. He wanted me to go into partnership and everything.

The Helen had about the same size furnace that we did, and it ran twenty-five tons a day. I suggested some changes, like not washing down every day like they did but only washing down I think

every other day. Then I went up there, and the foreman said, "Well, we changed back to washing every day."

I said, "How come?"

He said, "Well, we were only getting half the mercury on a two-day schedule."

I said, "Well, what do your heads run?"

And he said, "Well, we don't have the assays on that."

I said, "Well, you wait till you get the assays." And sure enough, the ore had dropped to 50 percent of what it had been running, and that's why they were only getting the same amount of mercury in two days as they had been getting in one.

Swent: It was because of the grade of the ore.

Ingle: Yes.

Swent: What were they washing down?

Ingle: The condensers. They had this beautiful little ore body. I went underground with the foreman and this geologist, and I said, "Well, you know you ought to be finding another ore body."

They kind of laughed and said, "Jeez, we have all this ore, and you're complaining that we ought to be looking for more ore."

I said, "Well, you know, this ore could end as suddenly as it started." I said, "It could go up one more set." They were square-setting. Sure enough, they laughed, and sure enough, it went up one more set, and then they were out of ore.

But it was fascinating because it was like that. It would all of a sudden start--you would have an ore body. And then it would quit just as rapidly because of some little change in the geology, just like in the Corona, where we had a clay bottom, but you went through the clay and--you see, the clay dammed up the solutions that brought in the mineral, and so it would pool under clay because that was impervious. So there you would have high grade. It made it fascinating. I walked out of the tunnel that night that we did that drilling and got that high grade, and I thought, "Aw, this is too easy." Well [chuckles], it wasn't long till it wasn't too easy. But that was the thing.

Francis Frederick a Good Teacher of Geology

Ingle: I had learned from Francis Frederick, this geologist who had an office in San Francisco. He was related to the Bradleys [Frederick's mother was a sister of Mrs. Philip Bradley, Sr.], and so he had done a lot of work for them. I learned a lot from him by studying maps. He would say, "Well"--now, all these cross-cuts on the map would end at a certain point, but you couldn't get back into the mine to look at them, see. But he would say, "Okay, there's a change in structure there, a fault or a dike or something that has cut off the ore."

I learned to read maps that way: look for these little insignificant-looking things that really told a story. When you would get in, you would study the mine, and in some cases they would have little cross-fractures that were mineralized, so every time you had cross-fractures, you would find ore. In this one mine--I wasn't consulting on that, but I was studying the geology. Hughie and I were doing some closures--you know, timbering off openings in the mine so that people wouldn't get hurt. One thing that I learned from Fran Frederick was look for little changes--changes in strike or changes in dip.

The Cactus Queen Mine, Ore in Troughs

Ingle: At the Corona, it was a change in dip where that high grade was that we never got to. Down at this one mine out in Mojave, it was troughs. They had a rake. The development had been straight down the dip, but Hughie and I went underground, just to see what the conditions were, and I noticed that the ore was always in a trough. By a trough, I mean that--see, this [demonstrating] would be the trough. Every one of them had ore in it, and nobody had ever noticed that.

I went to the manager. He was a good friend.

Swent: Which mine was this?

Ingle: This was the Cactus Queen. I said, "Well, look, these troughs seem to be the loci for the ore bodies." I said, "Have you got any assay maps?" He had them, so I said, "Okay, let's go on this level and see what it shows." We came to this trough, and right away, it was ore. I said, "Now, I'll bet you that when we get out of the trough, there won't be ore."

He said, "Oh, I don't think that's going to be right." We looked at the assay map. Sure enough, as soon as you came out of the trough, the ore was gone.

This was a series of troughs. They had not noticed the rake. I went into the office, and they had this map on the wall, and I said, "Jeez, look at the rake on that."

Bob Rivera said, "You know, nobody--and we've had some high-priced geologists in here--and nobody has ever noticed that." It was plain as the nose on your face.

Swent: To you.

Ingle: Yes. And then it was obvious once you pointed it out. That was the kind of thing that I was taught to look for, and to look for--oh, and we went down into another stope one night. I said, "There's got to be a reason for ore being in this drill hole and not over here." So they started studying the rock. Hughie was with me, and another geologist. This geologist said, "Well, here it is. Here's the doggone fault that cuts off the ore and steps it down"--or up--I can't remember which it was.

The Fascination of Small Mines: Detective Work

Ingle: But the details--and Al Taylor taught me that, too, in the Ladd Mine, which was the manganese mine in Tracy. I went mapping with him one day, and I saw how he mapped. I copied the same way. I got the details. With these small mines, you would take lefts and rights. I mean, you would lay a tape down that went as close to the center of a drift or a cross-cut as you could, and then you would measure to the walls. It was amazing that sometimes there was just a little change, and if you didn't do the detail on the workings, you didn't see that. But when you did it, then there was a change that signaled whether there was going to be ore or not.

That's what always fascinated me about small mines. I never enjoyed the big mines like the small ones because you were like a detective. You were trying to find a clue to, okay, where's the next ore body likely to be? Fran Frederick told me about this mine, this gold mine on the Mother Lode. He said that he read someplace where this geologist talked about contouring in the plane of the vein. So he did it in this one mine that had been pretty well explored. He said everyplace there was a little dimple in the footwall, that's where the ore body was.

Those are the things that fascinated me, and I was pretty successful on it. Of course, small mining is virtually a thing of the past.

Swent: How do you define a small mine?

Ingle: Well, back when I went to school, a hundred tons a day was a good-sized mine. It wasn't a big one.

Swent: A hundred-ton production from the mine?

Ingle: Yes, a hundred tons of ore that you would put in the mill. There were a lot of hundred-ton-a-day mines. But also some of them were only twenty tons a day, like our mercury, but we made good money at it.

Swent: If it's over a hundred, then it becomes a large mine?

Ingle: Yes. But, see, in those days, you had some of the big copper mines which were maybe several thousand tons a day, but you had a lot of smaller mines that were a hundred tons a day. They would run for years but, like in gold, the price would go down or the costs would go up, or L-208 [War Production Board order in World War II] shut them down.

The Independence Mine, Nevada, Over-Staffed

Ingle: The fascinating part--I remember out here in Nevada, out at Battle Mountain there was this little mine. This company had virtually gone broke trying to mine it, but they had put in big load-haul-dumps [equipment], and they had mined it about twelve feet wide, and the ore was about two feet wide. They had had some fabulously rich ore, but I went out and I looked at it. They offered me a deal on it. I told this guy that took me out, this engineer--I said, "I'm going to take a week and go in the upper workings and see what it looks like."

Swent: Which mine was this?

Ingle: It was the Independence Mine, I think. There are several Independence Mines. One of them was out there. But this was just a little [one]. I went into the upper workings, and it was plain as the nose on your face that the old-timers--and I met one of them, and he showed me some things, but what they had done, they had followed this vein, and then, when they got these cross-fractures, every one of them they mined for maybe ten feet or

twenty feet on each side of the main vein. That's where--I mean, the guy said, "You won't see anything up there." Well, it was plain as the nose on your face what they were doing, but here this outfit was mining twelve feet wide and just leaving a minimum pillar between the levels that they drove. The ore was--I mean, it wasn't ore.

We didn't have the money. I had a chance to pick it up for \$150,000. I didn't have \$150,000. But the guy said, "They got to take any deal you offer them." That was a completely equipped mine with a mill and everything. But it just showed you that if you looked at it with big ideas, it wasn't any good as a big mine, but it was tremendously--should have been--tremendously good as a small mine, especially since it was all equipped.

I went through the records, and they had produced over a ton of doré three months in a row. They had it over--too much crew in there. They were going to cut back the mill. It was a fifty-ton mill, I think. They were going to cut back to thirteen people. I would have had about six people in there, to start with. I don't know how many more they had. And then they had--gee, they had, I figured, a half a million dollars' worth of equipment in there. And they had about thirty men, and I would have had about six men underground.

Swent: Making money.

Ingle: Yes. And those were the things that--a lot of them were obvious. On this little mercury mine up in Trinity County, when I first went up there--

The Altoona Mine, Trinity County

Swent: The Altoona?

Ingle: The Altoona, yes. When I first went up there, Orrin Reed, the president of the company, said, "Find out why we've got good ore and we're not making any money." They had just a little furnace. I think that was twenty-five tons a day. I went up there, and our old partner that had--oh, what did I say?--the aneurism. Well, I had met him at another mine that I went to look at for the same outfit. Anyway, he was glad to see me. He said, "We've got to know what's wrong."

I went down into the mine, and I said, "Okay, what size crew have you got?"

He said, "I've got thirty-one men underground."

I found out they were triple-hoisting. They had--twenty-one men out of the thirty-one were trammimg and hoisting. I said, "You've got to sink the shaft before you make any money." So they did. But unfortunately, the price plummeted.

I told them they should get a contractor, and that was a mistake because Leo [Zeltner] could have run it, but I didn't know him well enough then, so I told them to get a contractor. He, the contractor, diddled around for a year and finally got the shaft down and got over to the ore, and the price went.

So timing is essential in a lot of cases. It's the difference between making money and not making money. There are a lot of things--

Metacinnabar at the Reed Mine

Swent: When were you at the Reed? Was that a consulting assignment?

Ingle: No, I signed on. Actually, what I was supposed to do when I went to work at the Reed was supposed to--they had the Great Western and the Mirabel and so I was supposed to go over and take charge on those mines and develop them.

Swent: This was for Universal Silvers?

Ingle: Yes. Unfortunately, they never got them opened up. I did a lot of work, and--let's see. I don't remember. Well, Fran Frederick was involved in the Reed.

Swent: This was '61 and '62.

Ingle: Yes. I went from the Reed over to the Great Western and the Mirabel, and I made surveys and did some sampling. But Universal Silvers was a promotional deal. They had some good ore, but they had an underground program. It was kind of a long tram, and they were hand trammimg, and they had three men. One of them would tram it from the face so far, and then another guy would tram it from there, another section, and then the third guy would finish the tram. Well, you know, it was too labor intensive. They had some ore, but it wasn't that great. They got into the old workings, and they didn't know they were there. The maps didn't show it. And so that ore was gone.

They had some high-grade--a little ore body on the surface that had been drilled by--was it Bradleys? I can't remember.

Swent: Bradley had the Reed Mine.

Ingle: Well, I think it must have been. They had drilled this little virtually surface ore body, and it was rich. But they were always hungry for ore. They had an open pit that wasn't good enough grade. We were scrounging for ore. The furnace boss was going to have to shut down and repair the furnace, but he was hoping we would run out of ore before he had to shut down [chuckles].

There was a little dump high on the hill. The dumps were small but had good-grade ore, so we were going to build a road up there and haul this ore down. Well, the grade had to be maximum all the way, from the top to the bottom. I got a dozer, and I used my hand level, and I kept that Cat on grade by using the hand level and maintaining a constant grade down the hill.

Well, there was a big dump that we had to go through. We called it the Keyhole Dump because there was a small pillar left that had been dug all around, but the dump was there. They didn't furnace it. While I was following the dozer down, I had time on my hands, and I started sampling this dump. The samples ran higher grade than what they looked, and so I discovered that it had--oh, what did you call it?--metacinnabar. It was metacinnabar. It was black, see? But nobody had noticed that because they had trenched the dump and done a lot of work on it.

These samples came back higher than I thought. I ran them through myself, through the crusher, because I didn't know whether the furnace superintendent would throw them out because he wanted to shut the furnace down [chuckles]. So I ran them myself, and they were surprisingly good, so I took a bunch more samples, and they turned out to be good, too.

Then I found out back in 1860 or something, they had noted metacinnabar in that dump, and it had lain there all that time.

Swent: A hundred years.

Ingle: The samples turned out so good that we ran ten thousand tons of that dump.

Swent: Oh, for heaven's sake.

Ingle: And so the guy had to shut down and repair the furnace! But that was the best ore we found.

Swent: And it had been there for a hundred years, in the dump.

Ingle: That's right. It was real fine. That's the way one ore body was at the Corona. It was real fine. You couldn't see the cinnabar without a glass, it was so fine. And yet it was good-grade ore.

##

Swent: I had asked you about some of your consulting work. Of course, you were working all over the place through those years. You might pick out some that are particularly significant.

Ingle: Well, let's see. We got Universal Silvers and the Reed Mine, and the Mirabel and Great Western. We skipped by Dasco Mines and Mojave Mining and Milling.

Dasco Mines, Hair-Raising Sampling of Carlots

Swent: Did you want to say something about those?

Ingle: It's up to you. That was more manganese. Dasco--we had a hundred-ton-a-day flotation mill, and then we had a sintering plant that was a batch plant. The name of it was Mace. We sintered the concentrate. I'll include Mojave Mining and Milling because Dasco was a short period, and then they sold the property.

One thing that I learned with my experience at Tracy: I learned that there were a lot of peculiarities that went with manganese. One of the things was that there were a lot of impurities. When we shipped to the government, we had to fall within the limits of each impurity. I can remember the combined silica-alumina couldn't exceed 15 percent. There was a limit on iron and a limit on phosphorous and a limit on fines and a minimum for manganese.

When we shipped--well, Dasco--we shipped to the government stock pile that was at Wenden [Arizona] at that time. That wasn't on the carlot program. With Mojave Mining and Milling, we shipped on the carlot program.

Swent: Now, what does that mean?

Ingle: You ship by the railroad car. If I remember correctly, you had to have ten cars that met the maximum allowable of all these things.

Swent: Why did they not want fines?

Ingle: Because with the carlot program, the government was supposed to treat the manganese concentrate. I think the problem was in their method of treatment and perhaps there would be losses. There would be losses in transportation, and so we had a limit on fines.

Swent: I would think they would want it as finely ground as possible.

Ingle: Well, yes. And I don't really understand except that, depending on the equipment they used--if they used a Dwight-Lloyd sintering plant, that was a continuous plant, and these pallets traveled on this track, and the sinter--the concentrate was usually mixed with sawdust, and there was a suction that pulled the air through the pallets on the sintering plant, so there might have been losses with the fines there.

But we had to learn both with Dasco--we did sinter. I guess we did ship some on the carlot program. Yes, we did, because we had to observe this ten-car batch that had to average the minimum on manganese and the maximum on these impurities, and so if we shipped anything below 40 percent (if I remember correctly), then it was a total loss. They would dump the cars, and you would have to pay for the rail shipments, so it was a real touchy thing.

I can remember we shipped ten cars out of Wenden, a ten-car lot. Using my experience at T-K Mines, I had an assayer, and he used to sample the cars. I told him, "You watch the government sampler take his samples, and then you follow and do the same thing because it doesn't matter whether the sampling is right or not. We have to meet that minimum and the maximum on the other things." In the sintering, it raised the grade of the manganese, but it also raised the grade of the silica-alumina and all the other impurities, so you had to balance that and make sure.

We found at Wenden, at the mine there, if we had less than 12 percent heads, we couldn't maintain grade. We would be too low in manganese. So we blended, and we got some real high grade that was too fine, but the sintering, you see, formed a cake and so you didn't have the fines. I learned after I got there that Dasco had gotten some fines from another mine, and they owed the other mine for it, so they put, you might say, a lien on the cars that I shipped.

I remember the ninth car--so then I would give them every other car. The ninth car on their shipment was a little bit low, and they were all afraid that the tenth car would not bring it up, but I knew how to blend it, and so we were about a tenth, about 40.1 percent on the manganese. It scared them to death, but it got it through.

We had to sample the way the government did it, whether we agreed with it or not. The last material put in the car had to be right or a little bit higher, and so we got--my calculations were that we had the minimum required so that it was legal and we weren't cheating them at all. We were giving them a little extra, as a rule.

Then also, at Wenden they sampled--the government guy would get in the car and take the samples, and so I had this guy watch him, and I said, "Okay, now, you do the sampling the same way he does because we've got to be above the minimum."

Down at Deming [New Mexico] it was a different situation. The government sampled the cars as we filled them. I went and watched to see how they did it. We had two different size trucks, and so we would dump one of them--I noticed that they took the same amount of sample from each truck. They weren't the same size, but they took the same amount of sample.

And then also they took it in a tub. I mean, these two guys would get under the bed of the truck in the back, you know, and they would cut a sample and put it in a tub, and when they got the tub full, that was the end of the sample. We had to figure out, okay, was the truck going to dump fast or dump slow? Because they had a tub full, you see, and it didn't make any difference on the size of the truck. So we had to figure out the fast or the slow and the combination that we would make up for the truck.

It was kind of a game, but we never cheated them. We always made sure that it wasn't going to run too low because if it ran too low, we didn't get anything, so we had to protect ourselves and we had to know how they were doing the sampling. And then, besides that, LeDoux was the only one that knew about this hydroscopic peculiarity of manganese. So it made a game out of it. But we always tried to play fair.

And then, you see, we had heavy media down there. We had gravity--well, heavy media is gravity. But we had tables and jigs, and so we had to balance all those things out. We were always just a little bit over what the minimum was. But it was sometimes hair-raising to wonder whether the last car was going to make the average, like it should be.

Mojave Mining and Milling, a Delicate Balance

Ingle: Mojave had flotation, and they had gravity at Wickenburg [Arizona], and so I learned there--I spent some time in the plant and learned the heavy media separation and, of course, I had had flotation. It was a real delicate balance, and we were skating on thin ice all the time because if we stumbled, we would lose ten cars and that would put us out of business.

And then also on the umpiring--we always won on the umpiring because LeDoux was the umpire, and they assayed the way we did.

So anyhow, that was the manganese business, and I became an expert in that, just like in mercury. And then it didn't do any good because manganese was dead. So I think that covers the operations.

Examination for Union Carbide for Tantalum in the Congo

Swent: What about Natomas? Was that the next one?

Ingle: Yes. I am not an expert on dredging. Johnny Wells knew that I had some placer experience in the early days of my career, when I was a kid, and I knew the principles of placer. He couldn't go. He was supposed to go to Congo, and so I went in his stead.

Swent: What was that like?

Ingle: Well, I thought I was going to examine one property. When I got to New York on the way to Congo, I found out that they had fifty properties. I think it was a million and a quarter acres, something like that.

Swent: Were their offices in New York at that time?

Ingle: Of Union Carbide Ore Company. And that was the overseas division of Union Carbide. I was supposed to decide whether they could mechanize or not. That included determining whether a dredge would work or not. Johnny warned me about big trees being buried and that sort of thing that would preclude dredging.

Swent: Had they been doing everything by hand before?

Ingle: Yes. They were mining--sometimes, on some of the properties, the creek being mined was not over six inches deep and two feet wide,

and they were doing it by shoveling into sluice boxes. What we were looking for, really, was tantalum. It was in the cassiterite. The emphasis was on tantalum, and I had to take all these samples. Then they would determine which properties had the tantalum. Some of them were that small.

There was one big flat that would have been dredgeable except that it was filled with these very huge trees, and so that ruled out the mechanization of any kind--by power shovel or anything else. They couldn't have mined it.

One other property looked like it could be mechanized. I thought that they could use a dozer and carryall, maybe. But I found out that they were taking twenty to thirty feet of volcanic ash that was over the ore. These guys were shoveling into sluices which carried the overburden away, but they were doing it so cheap, by hand, that you couldn't compete if you put equipment in there. So that was the other property that could have been mechanized, and the rest of them were too small.

Swent: Was this volcanic ash also under water?

Ingle: No. They would divert the flow of water and do ground sluicing and that sort of thing. There was a lot of hand work. One place that I figured that I particularly had to get some samples out of --those natives were walking like they were walking on eggs, because of snakes. The trails were cleared so that you could see the dirt. I mean, there was no brush. But they had a lot of black mambas in there. One of them--we were traveling in the Land Rover, and there was about a twelve-foot-long black mamba. Of course, we were in the jeep, but it rose with its head higher than the--if you want to call it the brush. And then it went off through the brush, with its head that high [demonstrating]. I have forgotten how many minutes you had if a black mamba bit you.

One of the things was that there was a second mine at what they called Lueshi. They found a new mineral there, and they named it lueshite. I wasn't on that part of the project, but we worked together somewhat. This guy told me that one day he was going to take a bath, and he reached across the tub, and he saw something out of the corner of his eye that moved, and he pulled his hand back, and this black mamba had come up through the drain and was in the tub.

Swent: Ooh!

Ingle: So he didn't take a bath quite then!

Then we had poisonous bees in this one place that I figured we had to do some sampling in it. It was overgrown. Of course, it hadn't been cleared, and so, boy, the natives were pretty cautious. They were scared. In order to do this job within a three-month period, which--I had to get back to maintain my spot in the Naval Air Reserve--so I had about ninety days.

What I determined was the first property was a fairly large stream, maybe four to six feet--well, wider than that, I guess--up to twenty feet wide, anyway. It was fairly deep, too. So I thought, well, the only way I'm going to get it done is to sample this one carefully, this first one, and cut trenches every so often, and then add up what the potential was and then use that. If that matched the Belgian company's figures, then I would say, okay, that's what's going to be used as the model.

On the other properties, I didn't have the time to do that, so I would take random samples, from measured off sections of the drainage, and then compare those with what the Belgian company had for reserves, and then add up the total. When I did that--I did that after I came back from Congo--when I did that, it was amazing how close I came to their estimated reserves. I don't know how many--I didn't get to visit all fifty properties, but I figured we walked about, oh,--well, we drove about fifteen hundred miles, and I figured we walked about 150 miles because we had to go through the jungle.

It was real interesting because the Belgian--I got into one pit to sample it, and he said, "You can't do that. You lower yourself. They have to do it." So I had to watch the natives do it. Then they dried the last bit of concentrate, and then they blew the last bit of the waste off of it, and then they did up the samples in probably bamboo leaves and tied them with vines. I brought all the samples out. It was quite an experience.

I had a special suitcase which I got for carrying the samples and all the information that I gathered. And they lost it. For three weeks, I couldn't write the report or do anything. I had to wait for that. We were living in Middletown then. They finally found the suitcase on one of the truck docks in Oakland or someplace like that, and so they called me and said they found it.

I didn't happen to be at the house at the time. This truck driver called from downtown Middletown. That's downtown! Anyway, he said, "What mood is your husband in today?"

She said, "Well, pretty good."

He said, "Well, I've got bad news." He said, "I was told to make sure that nothing happened to this suitcase"--and I told him three months of work plus the expense was wrapped up in that suitcase. Well, he said, "I put it aboard the truck," and he put it in the back, you know, because he's going to take it out first. And he said, "I was driving through Oakland, I think it was, and," he said, "I looked in the rear view mirror and the back doors had come open." He said, "There was a car right behind me, and that suitcase jammed under the car." I mean, the car ran over it; it didn't have time to stop. It jammed under the car, and he said, "We had to get the car up on the curb so we could get the suitcase out." And he said, "I gathered up every rock and every piece of anything that I could find, and I think it's all there."

Swent: Oh, my! [laughter]

Ingle: So anyway, it worked out okay, but it took me, oh, a month or so, I guess, to get all the samples organized. But it was--jeez, you know--

A Maddening Placer Mine in Brazil in 1966

Ingle: And then, when I went to Brazil, I went for Union Carbide Ore Corporation then. They called me up, and they said, "Can you go down to Brazil and start this little operation for tantalum?" Phillips Brothers had--when they offered the Congo, this Belgian company--when they offered the Congo properties to Carbide, they wouldn't separate the non-tantalum-bearing properties from the tantalum-bearing, so the deal fell through, and Phillips Brothers finally made the deal with them.

Well, Carbide was the number one user of tantalum at that time. They had figured to get their tantalum from the tin slags in Indonesia, I think it was, and then the Communists had disrupted things, and they weren't going to be able to get it.

##

Swent: So then you went back to New York.

Ingle: Then they showed me some of the tantalum they got. They had this little property, and it should have been mined in a matter of three to five years. It should have been mined at that rate. They said they had to mine it in--I don't know--several months. I went back to New York, and I agreed to do it, and then they showed me the tantalum. It was as fine as frog's hair. I mean, it was--

you know, in placer the fine stuff is hard to get hold of. They had mined some of it, and I said, "Well, how did you treat it?" They said they had this puddling box. My gosh, it had taken them several weeks to get a few hundred pounds. I was supposed to mine all this out--

You know, it's a long story--maybe it's too long.

Swent: No, I don't think so.

Ingle: Anyway, I said okay. I went down. It was during problems with the airlines. I was supposed to go right through to New York. Well, they took me--in Denver, I think, I had to take another flight. I got to New York, but in the meantime they scheduled me to go to Boston, so my luggage went to Boston. When I got to New York, I had all my gear for sampling and my work clothes and everything in this one suitcase, and they lost it, and I never did get it back. I had to buy new clothing and shoes, boots, and everything when I got to Brazil.

Swent: This is in 1966, I think.

Ingle: Yes. I finally got the equipment I needed. The problem was that they did this puddling, but I couldn't do that, and I didn't know why. I had to determine whether they could mechanize this or whether we would use a giant [monitor] and wash out this pegmatite dike, which was weathered and soft.

First I built a small sluice system. We got it all ready to go. I used an undercurrent, and I had to determine what riffles to use. I finally decided on cross-riffles. Then we set this thing up, and we had a cloudburst, and doggone it, we got soaking wet. We tried to hide under the sluice, and it washed the sluice out, so we had to rebuild it.

Then we made the test, and I found out why you couldn't mine it the way I had figured, because if there was an interruption in the flow of material, the pegmatite settled right then, and it settled so tight that you couldn't break it loose. I figured, you know, we'll have to stir up the riffles if it ever shuts down. That was one thing.

Because of that, we couldn't strip it hydraulically. We had to use equipment. We got a dozer in and a carryall.

Swent: Where was this? What part of Brazil?

Ingle: Out of St. John del Rey. That was way back in the boonies, between Belo Horizonte and, oh, what's the industrial town?

Swent: Sao Paolo?

Ingle: No. Belo is the big town, and St. John del Rey was--I can't remember whether that was the little town in the interior. I think we were quartered in St. John del Rey, and this other town was further in the interior. We were between it, between the two.

Anyway, we got this dozer. It took a solid week. The dealer in this other town--which I can't remember the name for sure--he didn't know how to put the blade--the blade was made in Brazil and the tractor was made in the United States. Finally, after a week of trying to put this thing together, they were going to cut things apart with a torch. I came by, and I said, "Well, let me look at the instructions."

Well, what they had been doing was trying to put it together backwards. They would have cut it up and made it [laughter]--so anyway, they got it straightened out. Ah, there were all kinds of things happened, but one of the things was that I figured, well, okay--I figured the size pump I needed because we were going to have to pump for this hydraulic unit. They had one in St. John del Rey. I think that was where we were quartered. They said, "But it's got to be rebuilt." I said, "Okay, go ahead and rebuild it."

And I went back then, maybe a couple of weeks later to get it, and the guy says, "Oh, I sold that to somebody else."

Swent: Oh, my!

Ingle: But he said, "There's another one in Belo Horizonte, and there's a truck coming up, so," he said, "you can get that one."

So I said okay. We were going to buy some pipe. They spoke Portuguese down there, and I didn't. I had to have an interpreter. I said, "Okay, we'll take that one." I went back, and, "Well, we sold that one." I said, "Well, for crying out loud." So I couldn't buy a big pump.

In this other town, they had told me that I could get a Lister diesel, and they had it in stock. I called them up and I said, "Okay, I'm ready for that Lister."

They said, "We don't have any. We have to get it shipped from England." You know, this was--

So finally Carbide helped me. I mean, the unit down there. And so I ordered two smaller pumps. They said, "Okay, we've got

the pumps on the shelf, but we don't have the diesels, and it'll take thirty days to get the diesels."

I said, "Well, okay. Supposing I furnish the diesels. Then can we get it right away?"

And they said, "Yes."

I said, "Well, I want them mounted together."

They said, "Well, it'll take us thirty days to get them mounted together."

I said, "Why don't you just make a frame and mount the two of them on the frame?" They hadn't thought of that.

Swent: Oh, my!

Ingle: So anyway, that's what they did. But it still took thirty days. We furnished the diesels. It was maddening.

Swent: Very frustrating.

Ingle: Anyway, they finally sent the pumps and the engines out from Belo Horizonte. I had told this "Portugee"--he couldn't speak English and, of course, my interpreter was gone, and so I told him what I needed: these sluice boxes. I said I've got to have them by, oh, two weeks or something like that. He nodded and nodded and nodded. I thought, okay.

So two weeks was up, and I said, "How are my sluice boxes coming?"

And he said, "Sluice boxes? What sluice boxes?"

I said, "The ones I ordered, and you said you would have them by this weekend." And he hadn't understood me at all. But he was one of these guys that he didn't want to get embarrassed by saying, "I don't understand you."

Swent: And he said yes.

Ingle: And so he didn't have them. The pumps and the diesels and the sluice boxes--he said, "I'll have them by this weekend." And he did. I mean, I'll say that for him. He really got on it. The sluice boxes and the pumps arrived at a little town between me and the mine. I was going to go out there this one morning and see how things were going. I got a call, and they said, "The bridge collapsed, and the sluice boxes were lost in the river" and this

guy's truck and everything. I just about--jeez. I was glad the pumps hadn't been on that truck.

So anyway, they rescued what they could. I think the truck was the only asset the guy had. But anyway, they did get them, and we got set up. But it was so frustrating because the pipe also got sold. I told them to hold it and instead they sold it. It was just, you know, a nightmare of trying to get things done. But you had to sit on everything because anytime they could sell it and maybe they could get a little more money, why, they would do it.

We had a jeep that--this Argentinean was going to take over from me. We rented his jeep to go back and forth to the mine. This one day we had the catskiner [dozer operator] in the back of the jeep, and one other person, I think. This catskiner always skinned cat barefoot. But anyway, we were going down the hill to where we had this ranch house that was our headquarters out in the boonies. All of a sudden, I saw him fighting with the gearshift lever. It was a steep hill, and he didn't have any brakes on the jeep.

And, you know, the culvert that they had was just two tracks across this ditch. Pretty soon, he had his hands full. He had to start just steering the thing because we were getting going faster and faster. We had a sharp turn at the bottom of the hill. I thought, "Uh-oh, I'm going to lay on my shoulder and take all the meat off." At the last minute, the guy had started the turn, and he got up on two wheels and then all of a sudden, he set it down, and there was a bank just a few feet between us and this bank, but he headed for it, and he dropped into the tailings from some sluicing that was going on up above, and the mud slowed it down and stopped the jeep.

One other funny thing--and maybe I'm taking too much time--

Swent: No, it's okay.

Ingle: We had this farm house rented. Of course, the pigs were in the yard, and there were massive amounts of flies. I mean, they just covered the walls. I had some insect spray. This little woman that was doing the cooking for us--she was in the kitchen, and I went out there, and I sprayed these flies. I mean, jeez--you know, it just covered everything. She said to this--I had the interpreter with me then. She said, "What's he spraying here for? There aren't any mosquitoes." [laughter]

Well, I came back with--ah, what do you call that disease?

Swent: Malaria?

Ingle: No.

Swent: Dysentery?

Ingle: Yes, amoebic dysentery.

Swent: How did you get rid of that?

Ingle: Well, I took medicine. As a matter of fact, Carbide--when you came back from any assignment overseas, they tested you for amoebic dysentery, and so then they would supply the medicine. Aw, jeez, that was really nerve-wracking to be in that. And then I overstayed my visa, my work visa, and they had to bribe a few officials, and it took me an extra week to get out. Anyway, that was Union Carbide in Brazil.

The Guadalupe and New Almaden Mines, Too Spooky

Ingle: Then, if we go back to '65--that was '66--Pennzoil and the Guadalupe Mine and the New Almaden Mine--we did exploration for Pennzoil on the Guadalupe. They had a lease of some kind on the Guadalupe Mine, and so we did some long-holing. This was with Fran Frederick. We found some ore, but not anything to really shout about.

But there was this one little shaft that a friend of mine was working in as a lessee. Fran Frederick and I surveyed the shaft, and boy, it was so spooky. The bottom section of ladder--you know, I was stepping pretty cautiously. Well, it went out. Fortunately, I was testing it when it went out. It was a little shaft, but it was rich. They could make a bottle out of one five-gallon bucket of ore. It was that good.

Swent: This is mercury.

Ingle: Yes. It wasn't too successful with Pennzoil, but then Pennzoil was taken over by Utah Exploration, I think it was. We were supposed to be consultants for Pennzoil, but there was bureaucracy in between, and so we finished with the Guadalupe, and then the New Almaden property owners wanted me to run the mine as a manager and to run the furnace and everything, and so I took that job on. I had a helper then.

It wasn't long until--I think it was New Idria got the Guadalupe and the New Almaden, and so then that was the end of it as far as I was concerned. We had a trouble-maker at New Almaden. I was going to get rid of him, but then it didn't make any difference. He was always saying that the ore was so good, and it wasn't that good. I mean, he was indicating that we weren't recovering it, and we were.

Andy Camelari had the lease on the New Almaden property. He was a pet dealer in---I can't remember--one of the Bay Area towns. Hughie helped me down there. We surveyed to come in underneath one of the old shafts. Andy would--he would get these projects going, and he would about get them finished, and then he would lose heart and quit. So that's what happened.

We were going under to finally go under this one shaft and get down below where they mined, and it was a long--I've forgotten--something like two thousand feet. We got up close enough, and so I told him, "Well, you better drill it before you open it up because it's full of water," and so they put some diamond drill holes in, but they didn't go far enough. So he quit on that. They hadn't timbered it well, and jeez, you know, it was just too spooky to be in there. So that was just a short interim.

I was at the Guadalupe for about six months, I guess, and then at the New Almaden for the balance of a year. The New Almaden, of course, is rated by the USGS [U.S. Geological Survey] as the best possibility for future mercury. But now they built houses all over it.

Swent: Yes. It's a state park.

Ingle: Yes. And so now they have to clean it up. They've spent, I understand, \$2 million already (the county) and the EPA [Environmental Protection Administration] is on their tail all the time.

Fruit Growers Supply: A Dead Duck Project

Ingle: So okay, we get to Fruit Growers Supply. This was Fran Frederick's project. He was ill, and so I went up to take care of it for him. This one guy that worked for him--they had found a little bit of cinnabar, but it was scattered, so they were doing some airtrack drilling. We had to do some mapping. Then this guy that had the company interested--I mean, he was one of their

employees. He was honest, but he didn't know mercury very well. Fran was in charge of the program.

The problem with this guy was that he didn't believe the assays from Martin Quist, see. He wanted me to go down to San Francisco and watch how Martin Quist handled the samples and everything. I said, "You're saying that I'm more competent than Martin Quist." I had done a lot of assaying, but I knew that Martin Quist was okay. So I went down, and we went over every step with Martin, and he still came out with not very much.

But the guy was--finally, I convinced him that Martin knew what he was doing. There was a lot of smells, but nothing substantial.

Swent: Why do Fruit Growers need mercury?

Ingle: Well, see, they had timberland, and this guy had discovered a little bit of cinnabar on the timberland, and so he was attempting to make a big deal out of it. I got acquainted with him and his wife, and I finally convinced him that--well, he said he believed me, so they finally abandoned the deal, but it cost Fruit Growers quite a bit of money, and it was a not very satisfactory project because I figured it was a dead duck right in the beginning. They didn't have enough to show.

Poor Mercury Prospects in Mexico

Swent: And you did something for them in Mexico? Was that for Fruit Growers?

Ingle: No, I went down to Mexico for Union Carbide, to examine some mercury properties that they had heard about. I reported to the manager of--aw, shoot--I can't remember--but the big silver mines down there. Jeez, they had hundreds of miles of underground workings.

Swent: San Luis Potosi?

Ingle: No. You'd know it if I get to think of it, because they had hundreds of miles of underground workings.

Swent: Where were they?

Ingle: They were out of Mexico City. I made contact with the manager. Maybe I'll think of it. Ah, jeez. It has been going for hundreds

of years. Well, anyway, I think he had some business relation with Union Carbide Ore Corporation. So I went down to see what they had in the way of mercury. We took horses up into the mountains and went to the diggings. It took us almost a day to get there by horseback. It was up in the mountains. They just had some shallow workings, and they were bringing it out by hand. They had torturous little holes. They didn't have any regular shaft or anything. And they had a Coke bottle that was maybe three-quarters full of mercury, and they thought that was great.

But they didn't have anything. They cleared out the goats from a little house, and that's where I had my bunk. They insisted on feeding me. I took supplies in, but they insisted on feeding me. They killed this goat and made kind of a stew. It was pretty good, but the last morning they gave me what I called goat guts in broth.

Swent: *Menudo.*

Ingle: Oh, okay!

Swent: Horrible, isn't it?

Ingle: Oh, jeez! I took one helping of it. Well, this Mexican engineer was with me. When we rode out of camp that morning, he said, "You didn't like that too much, did you?" I said, "No, boy!" I wanted to be polite and ate one helping, but then when I got back to Mexico City, I got horribly sick.

##

Swent: You were saying they didn't have any mercury that was worthwhile.

Ingle: Right. And then I made another trip to Mexico for an outfit from back East and looked at some old, old mines.

Swent: This was for mercury also?

Ingle: Yes. They weren't suitable. The notable thing on that trip was that we tried to climb--take this van or--it was not really a van, but anyway, we tried to get up this grassy road, and it was getting dark, and this guy tried to back down, and he dropped one wheel over this rock wall, and we had to stay there overnight--he and his wife and a couple of other people and a Mexican and myself.

In the morning, they brought a team of horses up at daylight and pulled the vehicle back on the road, but then we didn't have time to go get up to the mine. They figured, well, I could go up

there by myself. We went back down and went to the house that this Mexican lived in. We didn't have any dinner, we didn't have any breakfast, and it was about noon by then. His wife whipped up a bunch of tortillas--really good. She flipped them, like they do.

I went back and I got caught in a flood. I had to stay on the other side of the river for a night and two days or something like that.

Swent: Where was this?

Ingle: This was in Mexico.

Swent: What part of Mexico?

Ingle: Oh, it was not far out of Mexico City. It was an old, old mine. It dated back several hundred years. But I remember I went up with this guy that I went with the first time. We got up there, and I stayed late enough so that I wasn't going to have to go back. It rained, and I remember it was so dark that he had a white shirt on, and we were riding horses because of the flood, and that's all I could see was his white shirt. We came down in the dark.

Always Sample the Best Ore

Swent: Was there any mercury there?

Ingle: No, there wasn't enough. The thing is, my theory is that you go to a property and you let the guy show it to you. He should know more than you know about the property. If what he knows is not of interest, you look at it from, well, maybe he's missing something, but if he can't demonstrate that the property is worthwhile, then the chances are that it's a dud. Because he should know, and he's trying to make a deal.

What I would do when I went to a property, if it was one of those like that, I would say, "Well, where's your best ore?"

Usually, they would say, "Well, you don't want to sample the best ore. That'll be misleading."

I would say, "Yes, I want to sample your best ore" because normally, when you sample the best ore, it's no good. If they say that's the best ore, then--some of these people--there are

assayers that say you can only get the gold if you do it this way, and if you don't fire assay for gold, if you can't do it normally, the way that the storybook says, you're just wasting your time.

That's my approach. I've been to two or three mines where I would say, "Okay, where's your ore?"

And they would say, "Well, this is it. We've got this little stope, and we can provide a hundred tons a day for the mill, for down here at--" at Mina [Nevada] I did some work for them. On this one property--and this guy was supposed to be a graduate engineer, and he was a nice guy--but anyway, we went into this partially-mined-out stope, and I said, "Okay, now, where does the ore start?"

They would say, "Well, right here."

And "How far does it go?" Well, then they would say so many feet. And "How deep are you going to go with this stope?" And then "What's the width?" They would give me all the figures. I would say, "Okay, you've got two hundred tons in the stope, and you're going to provide the mill with a hundred tons a day?"

Swent: [chuckles] Two days!

Ingle: Yes. Well, they had never calculated that.

Another one, a mercury property I went to, and this was for the electrical people that took over the Natomas yard, and so the president of Natomas asked me if I would do them a favor and go look at this mercury property. They said they were ready to put a furnace in. They wanted to put a 100- or 200-ton-a-day furnace. So I went. He told me--I mean, he was honest--and he said, "Okay, I've got this little bit of ore here, and I've got this little piece of ore here, and another one"--and they were just kind of hot spots.

I added them all up, and I said, "Okay, what are you figuring for depth?" He had a figure. And so I told him the same thing. I said, "Okay, you want to put a furnace in? You've got 200 tons of ore showing."

He said, "You're right." He said, "I wish I had had you come down here before I spent the money." [laughs] Very few people are that way. Usually they're mad at you for shooting them in the foot.

Well, let's see. I guess we better get to--

Swent: Was the old mine in Mexico at Pachuca?

Ingle: Right! [laughs] Yes, doggone it, that was pretty interesting.

VIII A BRIEF PERIOD AS A BUREAUCRAT

Doing Research for the Bureau of Mines at FMC Coal Mines

Swent: Well, I'm glad we've got that one.

Ingle: Yes, okay! Well, let's see. Well, we're down to FMC, I guess. They had an engineer down there, a mining engineer. They had a group that were developing advanced products for underground coal mines. I was drilling at Alameda [Naval Air Station] then.

Swent: Alameda?

Ingle: Yes, drilling. No, I mean, drilling in the navy.

Swent: Oh, all right. [laughter]

Ingle: This guy was in my outfit, and I was looking for a job, and so he told them about me. They needed another engineer. I hadn't had any coal mining experience, and they said, "Well, you've done some design work."

I said, "Yes, the way I design is I go out and look in the junkyard and see what's there and see what I can use." Well, this started out as \$1.5 million contract with--I'm not sure whether it was with MSHA [Mine Safety and Health Administration], but anyway, it was with the government. It ended up over \$10 million.

The idea was we were developing remote units, a roof-bolting machine, and remote control on some of these other things; like we went in and studied longwall operations and header machines, and then even small machines that worked in low coal and skidded around on the chassis. It was pretty interesting. I spent quite a bit of time in the coal mines.

I had the communications sled, we called it. We studied the wave length and the relationship of the size opening, and we did--

this roof bolter that they finally built was automatic. We had mechanical problems. I kind of enjoyed the work because it was new to me, and I figured that the hard-rock miners could learn a lot from the coal miners. They could use some of the equipment in suitable hard-rock mining.

But we worked on those machines, and I had to design a mining method where you didn't get the machine into a corner it couldn't get out of; you had to plan these panels and plan the mining so that you wouldn't be trapped in a box. You had to fit these machines into the workings. It was new to me. But, like I say, it looked to me like you could apply a lot of the coal mining techniques to hard-rock mining, if you picked the right places.

Swent: Were you doing this just in theory, in an office?

Ingle: Oh, no, no. No, we went into Kentucky and West Virginia and Illinois. And studied those mines, studied the problems. We had the dust control and that sort of thing.

Swent: This is with the U.S. Bureau of Mines?

Ingle: Yes.

Swent: And FMC, working together?

Ingle: Right. Yes, it wasn't MSHA; it was U.S. Bureau of Mines. I got to know a lot of those people. It was interesting, but the cost overruns were pretty terrific. Of course, we went from I think \$1.5 or \$2 million up to \$11 or \$12 million. I ended up as the chief mining engineer because this other guy went with Arco. He wanted me to go with him, too, but I was satisfied with staying where I was until--

We would get these requests for--oh, what do they call them?--they were requests for a bid on these different projects? On a lot of them, I said, "That's not going to help the mining industry. It's not going to help the public. It's not going to do anything. It's going to be a waste of money. It's frivolous. Don't even give them the courtesy of a reply."

And they would say, "Well, somebody's got to get the money."

One day I was sitting in the office, and I felt frustrated to beat the band. I thought, I didn't go to school to be a mining engineer. I really went to be a mine operator and to learn how to run a small mine. So I gracefully bowed out.

The Value of Some Junior College English Courses

Swent: Where was the office that you were working in?

Ingle: It was in San Jose. And they were good people. I mean, I don't mean to cast any aspersions on them--especially the people that were doing the work. This is one thing: When I started to school, I said I intended to go three years to junior college, and I took all these courses on public speaking and writing and things like that. And I used it there. I used to rewrite the electrical--I didn't know any electrical engineering or mechanical engineering, but I had some people that did know it, and so they would write a report. I would read the report, and I would say, "My gosh, they didn't know sentence construction, they didn't know spelling." That's the criticism of engineers, that I had heard: they can't communicate.

And I took a report-writing course from this one guy down there. I would get the reports from, like, the electrical engineers and the mechanical engineers, and then I would rewrite them. And then I would take them and say, "Okay, now, have I told any lies here? Is this all true?" They would say "Yes" or "You made a mistake here" or something like that--and correct it. That stood me in good stead then.

This guy that gave the writing class--he said, "Aw, shoot," he said, "you can do as well as I can." But, see, I was interested, and I didn't want those guys to get embarrassed by turning in a foolish report. So anyway, I enjoyed the work there except Janet was still up in Middletown.

And then Dick had his accident while I was working for them.

Dick Ingle's Serious Auto Accident

Swent: What was that?

Ingle: He was working for--during the summer, and spent his eighteenth birthday in the hospital. It was a summer day, and it was warm, and he was eating his lunch, and this guy was supposed to be following Dick up to repair this piece of machinery. It was in Middletown. He was coming up through Pope Valley. Dick fell asleep, and he hit the only oak tree that was there. I was, of course, down in San Jose. It took them forty-five minutes to get him out of the pickup.

He had--oh, part of his face was kind of hanging loose. He bruised his heart, and he broke a leg and his back, and he had a concussion. Anyway, we thought he wasn't going to make it. They took him to the hospital. Dick was conscious, but they couldn't get him out of the pickup for a while. They were afraid of fire. The guy that we go over and stay with at Middletown--he was managing the ranch. Well, it was on the ranch property, but it was on the highway.

Anyway, Dick had left his car and was using my pickup, and he left his car without fuel in it. Janet called--this girl said, "Your son has been in an accident and he asked me to call you." Janet realized that there wasn't enough fuel in Dick's car, and she called Earl's wife and told her. She said, "Would you come out and get me? Dick has been in an accident." It was noon, and Uncle Earl was up at the house, and he said, "Where is it?" And she said, "At Black Oak Villa." And he said, "I'm on my way."

Dick was so happy to see him. He didn't know whether he was going to live or die. He finally came to. And they couldn't get him out of the pickup. So the ambulance went down. Dora, Earl's wife--she died a couple of years ago--she came in and got Janet, and they started back out to Black Oak Villa, and then the ambulance came by, and Dora turned around and followed it. The ambulance people knew Janet, and the guy in the back said, "His mother is following us in a car." And so they stopped and let her in.

They didn't think he was going to make it. They took them I've forgotten how many hours to stitch him up.

Swent: That's where he got interested in being a doctor?

Ingle: Well, he had leanings that way. He was in bed. He was in the hospital I've forgotten how long, but a couple of months, anyway. And then he was at home in a cast. He knew what it was like. He had always had kind of a--well, I can't remember whether it was before or afterwards. He went to work in Santa Rosa on an ambulance. He never wanted to drive. They were supposed to take turns driving, but he always wanted to be in the back, working on the patients. This one woman had vomited and wasn't breathing. Dick, despite the vomit and everything, he gave her mouth-to-mouth resuscitation, and he brought her back. We said, "I guess he can be a doctor."

Swent: It was a good test, wasn't it?

Ingle: Yes.

Swent: He's a successful doctor today.

Ingle: Yes. And he still loves it. He loves it like we love mining. Solomon said, "If you can't enjoy your work, there's nothing else." That's why we're hanging in there on the mining as long as we can.

Swent: But that was one reason to leave San Jose and go back to Middletown, then.

Ingle: Well, yes. Hughie was in the navy, down at Moffett Field. Janet finally called me. It was several hours later because she was waiting for them to come out of the emergency room. And so then I called after I got home. No, I can't remember. Because Janet called me, and she said, "Dick's in bad shape." [pause; overcome with emotion] It still affects me.

Swent: I'm sure. Of course.

Ingle: So anyway, I called Moffett and told the duty officer there had been an accident, and Hughie needed to come home. He had the duty or something, and he said, "Okay, we'll relieve him." But he just kind of--he didn't think it was serious. This doesn't happen. So then he came up. He got up to Santa Rosa in the middle of the night. My son-in-law brought him up, and he went to the hospital the next day. But somebody told him, "You're supposed to go home," and he thought, "Oh, well, it's not much." Boy, I'll tell you, there was a lot of praying going on.

Swent: I'm sure.

Ingle: Well, let's see--

IX OPERATING SMALL MINES

Hughie's Heroic Rescue Effort in a Talc Mine

Swent: Hughie had an accident at some point also.

Ingle: Yes, in the mine, in the talc mine. The talc--we were given to believe this whole area was talc, and we found out it wasn't. It was boulders of granite encased in talc. But the volume of ore wasn't there. We found one area where along the contact, along the footwall, there was some good talc. So we were mining that. Leo was working with Hughie. He's the old guy with the aneurism. He was working with Hughie.

I was running the sorting plant but also I was keeping track of the mine. Leo was running the mucking machine, and he had, oh, about a half a car left to muck up in this heading, and this big boulder was almost too big to come through the timbering we had. We had sets in there because the talc was hazardous. It wouldn't give you warning if it was going to come in. Normally, you get a little dribble and a little dribble and when you get enough dribbles, you back out and wait.

But anyway, talc is not that way. It will just all of a sudden drop. Well, Leo was--of course, he couldn't hear very well, and he was on the mucking machine. About a two-ton boulder dropped from the back and came down the side and came between these two timbers, between these two posts. It could just barely fit. Leo didn't hear it coming, and I had asked him--I said, "Well, do you want to clean that up, Leo, or shall we shoot another round?"

And he said, "Oh, we might as well clean it up."

Well, the boulder came through the timbers, and it kind of laid over against Leo. It was cutting off his air. He couldn't breathe, and he couldn't move. I went in, and I couldn't move the

boulder. It was too heavy. But Hughie got in there, and he realized that Leo couldn't get any air, and so--I don't know how he did it, but he got that two-ton boulder--he put his knee under it and rested it on his knee and moved it enough so that Leo fell out from between the mucking machine and the boulder.

Hughie thought he was going to give him a hand, and--

##

Swent: You said that Leo was just lying there, and then Hughie couldn't get loose.

Ingle: Yes, and Hughie couldn't get loose. And I couldn't move that boulder, even with a bar. And Hughie was hollering. You know, there's two times in my life that I panicked momentarily, and one of them was when I crashed in Korea, and this was the other time. I didn't know what I could use to move that boulder. I ran to--we had a jack on the locomotive, and I couldn't find that jack. I was going to go outside and see what I could find, and meantime, this boulder was settling all the time. It finally broke Hughie's ankle.

But then I went back. I figured, well, jeez, I had to get something, and I found the jack, and I thought if I tried to jack it up, the head of the jack will just slide up that talc because it was slippery. But I got it, and I got it under the boulder, and I jacked it up just enough, and it held. And I jacked it up just enough so Hughie could get his leg out.

We shipped that two tons of talc! But, see, Leo--it had broken three of his ribs. Unbeknownst to us--Hughie's ankle started to swell. The guy that was trucking our ore came down to the camp then. We got Leo out. Hughie and I packed him out. I mean, Hughie had this broken ankle, but he didn't realize it was broken. He thought it might be just strained, and so we packed Leo out in a meat basket.

Swent: In the meat basket?

Ingle: Like a navy stretcher? A wire deal. We called it a meat basket. We did in the navy, too [chuckles]. So we packed Leo out. This trucker came in--well, I think it was--I can't remember whether the trucker came in that same day or the next day. I think he came in the next day, and he had a CB [citizens band radio]. What was funny was we put Leo in the pickup, in the back of the pickup, and we had a piece of plywood in there. When we got down to camp, it was--I don't know--fifteen hundred feet down the side of the mountain--

Swent: Where was this mine?

Ingle: Oh, it's in Saline Valley [California]. So we put Leo in the back of the pickup, and we got down to camp, and we had a piece of plywood in the bottom of the pickup bed, and I pulled Leo out, and, boy, he had a bunch of splinters in his butt from that plywood [laughs].

Swent: He didn't need that!

Ingle: No. So anyway, we didn't figure we could take him out in the vehicle because it would be jarring and everything, so we tried to get the navy--because I was still in the navy then, in the Reserves--to bring a helicopter from China Lake, and they would have done it. They were willing to do it, but the sheriff got in the act. We used the CB, and we had to relay through another CB unit in Saline Valley that was out in the valley.

Well, the trucker had the CB, and so we called the sheriff, and he interfered and said, well, we can send the helicopter in, but he can only take one man. Leo said, "I'm not going alone." Finally, the helicopter decided that they could take one extra passenger. But, see, China Lake could have done it. It would have been a good operation for them.

So they sent the helicopter in, and Leo and I went out, and Hughie was going to drive the pickup out, and all the time, he had this broken ankle. Well, we got into Lone Pine, and Hughie had to drive out--it was about a two-hour drive, or three-hour drive to come out the lower end of the valley. I went with Leo.

When we got out--this old-time doctor. You know, these stories get too long.

Swent: No, that's okay.

Ingle: But this old-time doctor--I mean, he was an old-timer, really. He gave Leo some pain pills and I don't know what else. But anyway, we knew the guy that owned the motel in Lone Pine, and so we stayed there. Hughie came driving in finally in the pickup. The doctor looked at his leg and he said, "We need to X-ray that." He said, "The bone is broken." If it had moved at all--it hadn't moved at all--if it had moved at all, he said, "You would have been a cripple for life."

These old-timers--I mean, they're something else. The doctor said--and we didn't have insurance, and Leo didn't. Well, the doctor--we had to stay there several days. I can't remember how long now. But anyway, the doctor said, "Well, how about you going

up with my wife and taking my car up to Independence because they'll work on it up there and fix it, and you bring her back?" And he got bouquets of flowers for the nurses, you know?

And when he discovered Hughie's leg was broken, he said, "Well, you know, these insurance companies are foolish because if you use the emergency room, it'll cost you a hundred dollars." I mean, this was back in--I can't remember now when it was, back in the seventies, I think. So anyway, "It will cost you a hundred dollars." And he said, "I can set that leg in my office and save you the hundred dollars." And he said, "If you'll help me."

I said okay, and he said, "Well, now, I've got to find--I haven't done it for several years, but," he said, "it'll save you a hundred dollars." So he said, "But I've got to find all my stuff. I haven't used it in a long time." So [chuckles] he found his--

[tape interruption]

Ingle: I said okay, so he found all his gear. Oh, I can't remember. Anyway, it took a little while because he wasn't used to doing this thing, but he set Hughie's leg. Leo was still on these pain pills. I told him, "Leo is in quite a bit of pain, you know, because he has only taken these pills at intervals," because the doctor said every two hours or whatever it was.

"Oh," he said, "I didn't mean to not let him take pills." He said, "Let him take a pill every time he gets pain." Well, jeez, Leo gulped those pills down. They were supposed to last for a week, I think, and he had them all down within about two days. And so [chuckles] I told the doctor, "Well, Leo needs some more pills." He said, "WHAT?!" And Leo staggered down the hall. Couldn't even walk [laughs].

Swent: But he was in no pain.

Ingle: Yes. But anyway, that doctor--we went back there. He said, "Come back in three weeks," I think. And he gave us a set of new crutches. Hughie went back to get the cast off, and the doctor got the cast off, and he said, "It looks like it's all healed. I don't think you need a recasting."

We said, "Well, we'll bring your crutches back" because they were new crutches, and he said, "Oh, you need them more out at the mine than I do." He was just out of this world.

Swent: That's wonderful.

Ingle: He had an interest in some uranium claims. I told him--I said, "You know, most of these uranium deals in this country, in that country--in New Mexico, that was different, but in this country, boy, you watch yourself." I tried to warn him, but he was just one of the old kind. I don't know what he charged Leo, but Leo was on Medicare. He charged Hughie, I think, seventy-five dollars. You know, I mean, we have run into some marvelous people in our life.

It renews your faith in human beings. Nowadays we've got so many scroungers around, but, oh, the experiences we've had with people. I wouldn't trade them for a million dollars, I don't think.

Swent: I'm sure you've treated people well, too.

Ingle: Well, we've tried to, yes.

Swent: You don't always get the same kind of treatment you give, but it helps.

Ingle: Yes. Well, it's kind of a bygone era, I guess. But anyway, that's one of the reasons that I like the business I'm in.

[tape interruption]

More Recollections of the Congo

Swent: We have had a little lunch break here now. You wanted to tell a little bit more about your house boy in Africa?

Ingle: Oh, yes. My wife reminded me that if I told you about the sharpened teeth.

Swent: No, you haven't.

Ingle: I didn't find out till after I had been home. I read an article, and it said the sharpened teeth were the sign of the cannibals.

Swent: Oh, my. And your house boy had sharpened teeth?

Ingle: Yes. In fact, the cannibals ate a Belgian. He was sailing in Lake Kivu, which was the province--I was in Kivu Province. He landed on an island. I don't know whether he intended to or not, but anyway, they ate him.

Oh, one other interesting thing: While I was there--I was there right after Congo got its independence. It was Belgian Congo, you know. They set up their own government. They were going to do like the westerners do: they were going to start taxing the people. And so they sent seven tribal chiefs into the province below where I was. They explained to the people how they wanted to tax them, and you know what happened to them? They all got eaten.

Swent: Maybe we should do that!

Ingle: Yes, that was a good protest! [laughter]

It was funny. And then we had a hard time getting across the border when we wanted to go out into Rwanda. We had to fly out of Rwanda, and they didn't want to let us go across the border. We finally found out why. The stamps that they used to stamp the passports, the rubber had come off the stamp, and so [chuckles] they couldn't stamp [the passports]. It was a tragedy.

There was a hospital that was half built. We were trying to get around Lake Kivu once, when we came back from the bush. A bridge had washed out, and nobody repaired it. I mean, it was washed out for weeks. We had to go around through Rwanda, and they were having trouble with--oh, I think it was the Tutsis, but they had a different name for them. But anyway, the United Nations had moved them out of Rwanda into Kivu Province, I think it was.

We had to go around the other side of the lake, and so we ended up traveling at night. We came to this roadblock. They were checking all the passports and everything, and these guys were lying out in the brush, with their rifles turned on us. We didn't know whether we were going to get through there or not. But we had a pretty good guide that understood them pretty well.

They had shot up some of the mining company vehicles. In fact, the government had taken three sets of vehicles from them. And then this one province--the only thing they had left for transportation was a dump truck, and so the government officials drove around in this dump truck. It was tragic. And the revolution was going on at that time between Tshombe in the copper province--I've forgotten what that was. But anyway, that's where he was fighting from.

It was pitiful because, you know--the United States was instrumental in getting rid of the colonies of the British and the French. Well, all they did--and this Belgian told me--he said, "The only reason they aren't eating each other is because the

Belgian government won't let them." Well, it's just like Yugoslavia now, you see? Tito, who was a Communist dictator--but he wouldn't let them fight. And so now we turn them loose, and they're killing each other. It's hundreds of years they've been at each other's throats.

Swent: Well, we're not going to solve that today.

Ingle: Oh, no, no.

Swent: I think we'd better get back to the mines.

Ingle: Okay.

Swent: You wanted to tell a little more about Hughie's accident in the talc mine.

Ingle: Oh. I just wanted to say that one of the things that was rather hard to take was he was trapped in there, and we weren't sure that the timbering would hold because, you know, these big boulders were dropping out of the back. It turned out that that one boulder was the only thing that came through the timbering. But it was a little bit scary because we weren't sure whether the timber would hold. We had done a good job, and it did hold, and that's the only thing that came through.

A Close Call in Blasting at the Corona Mine

Swent: In all this mining that you have done, and Hughie, you have had very few accidents.

Ingle: Yes. That was the most serious one. We had some close calls. In fact, at the Corona, in that stope that we were underhanding, we were just cutting random fuse, and we would shoot the bottom at various places, not with regular rounds but just here and there, where it was hard. In one case, I was timing the shots, and it was wet, and so we would have to sometimes cut the fuse where it was split and then split it again and then light it again because if you didn't have shots that went off, then that would kind of destroy the round, you know, the effectiveness of it.

And so I was timing them and I had the wrong burning rate for the fuse, and so this one time--finally, I told Hughie, "We better get out of here." We had to climb a short ladder and got behind a pillar. Well, before I got behind the pillar, the first shot went off, and it grazed my back with rock.

You try to be as careful as you can, but you can't foresee everything.

Methane in Some Mercury Mines

Swent: What sort of safety equipment did you have?

Ingle: Actually, we didn't have--there weren't any self rescuers then. We had a safety lamp for methane because a lot of the mercury mines had methane gas in them, and they had some explosions. Some of the mines you weren't supposed to smoke in. That's one thing old Leo--he was working at--I can't remember what mine it was. I think it was one of those in Lake County. But anyway, he was mining high grade, and so he only had to mine a small tonnage every day to mix with the lower grade. It was a methane mine, and they weren't supposed to smoke in there.

One day--I think it was Phil Bradley came up into the stope, and Leo was smoking and Phil was smoking [chuckles]. They did have at the Abbott Mine--they did have an explosion early in the fifties, I think it was. I don't think anybody got hurt, but they got scared anyway. But that was another thing that was bad in some of the mercury mines.

Preventing Salivation in Mining Mercury

Ingle: Oh, one other thing of interest: At the Socrates Mine, they had a lot of free quick[silver]. Leo worked in there for a while, too, on contract. He said that they would go back in shortly after a blast--I mean, too soon, when the air was full of vapor from free quick--because they were on contract. He lost his teeth, and he figured a year and he would do it.

But our family doctor in St. Helena--he told us that he had a friend, a doctor friend, that was studying early-day California medical practice, and one of the cures for syphilis was they would assign them to the Socrates Mine for a month, and by that time they would be salivated. That was the only--I'm not sure it was a cure, but it at least slowed the syphilis down.

Swent: Did you ever have any salivation?

Ingle: No, we never did. And neither of the boys 'id.

Swent: You were sleeping right by the retort.

Ingle: Yes. But we used masks, and we washed down. We used masks when we pulled the hot rock. And everybody washed their hands before they ate, and if they were smoking, they had to wash their hands. We had--oh, this Tony Gargiulio--he just died a few weeks ago, three or four--it has been four or five weeks ago now--he lived over in Middletown.

Swent: What was his name?

Ingle: Tony Gargiulio, G-a-r-g-i-u-l-i-o, I think it was. He worked for us while we had the Corona going full bore. He was salivated at the Helen Mine. He wasn't told to stay out of the fumes from the stack, and he did some repair work. He didn't lose his teeth, but he got pretty well salivated. But while he was working for us, he had to check up, oh, every few weeks--I have forgotten how often--but the salivation, the quicksilver in his body, gradually decreased, and he always got a clean bill of health because the half-life of mercury is supposed to be six weeks or something like that.

When they say that it is cumulative, that's not true. You get rid of it. The idea is if you get a dose that might salivate you, then you're removed from the area where there's dangerous fumes. That was part of the safety deal. But there weren't so many rules and regulations--I mean, specific regulations that you had to follow.

Coping with Acid Water and Bad Air

Swent: What sort of protective clothing did you wear?

Ingle: None.

Swent: Did you have special boots?

Ingle: No, we didn't. But what we did was after we got our shower out there built and everything, then we changed clothes out at the mine. We wouldn't take them home with us. But before that, we did, and we never had any trouble.

Swent: What did you wear in the mines where you worked?

Ingle: Oh, of course, rubber boots because if you didn't, the nails in your shoes would disintegrate, and your shoes would fall apart.

Some people would come out and visit the mine, and they would wear tennis shoes and walk around the dump, and then the next day their shoes would come apart.

Swent: From mercury?

Ingle: No, from the acid. The reason was not the mercury but the marcasite in the ore. If we didn't cover the rails where there was a drip of water, it could chop a twelve-pound rail in half in a week.

Swent: Oh, my.

Ingle: Just from the drip, drip, drip--yes. So we had to cover the rails when we weren't tramming.

##

Swent: You said you would lose your britches if you sat on a muck pile?

Ingle: Yes. You had to be pretty careful. It was powerful stuff.

Swent: Were these rubber boots--did they have steel toes?

Ingle: Oh, yes, we wore steel-toed boots. If we were consulting and in a mine where we weren't sure of the air, we took this safety lamp, which--let's see, I've got in the garage out here. It protected--it had a brass gauze around the flame, and that prevented it from causing an explosion if you had methane. It kept the temperature of the lamp down. And then, for lack of oxygen, you would watch the flame. If it started to go down, then you would know you were getting in bad air. And so you would beware.

I've gotten into bad air--well, down in the Guadalupe, I went into a stope one time. We were open pitting, and this had been mined underground, and so we broke into the top of the stope, and I went down. I was looking to see whether we could use a shaft that had a lot of trash and garbage thrown into it, and I wanted to get down and see the lower end on the first level.

I was by myself, and I started down this bald-headed raise, which ended in a chute on the level. The air was bad. I could tell it was pretty bad. But when my nose dropped below the bottom of the stope and was just into this bald-headed raise, there was no oxygen at all. I mean, right away it just cut off. If I had lost my footing, then I never would have gotten out of there.

So you had to be careful. But if you were reasonably careful, unless you fell--well, Leo at the Abbott, in the early reopening

of the mine, Orrin Reed, the manager, was with him, and Leo was a pretty heavy guy. The ladder ended above the muck pile or the floor of the stope, and Leo jumped down and passed out right away. Reed caught him and pulled him out. You just had to--I mean, it was just a matter of getting his head up a foot or two and it was different.

But oddly enough, there was a family winery out of Santa Rosa, where we lived, and we knew the people real well. The son--well, the grandson of the people that owned it when we first went there --one day there were two men cleaning one of the wine tanks, and he got up to see how they were doing, and they both passed out. He got down there to help them, and all three of them died.

Swent: Oh, my.

Ingle: So there are hazards that you don't think about.

Swent: That's true.

Ingle: Anyway, that was a tragedy that all three of them died.

Swent: You probably always wore a hard hat?

Ingle: Oh, yes.

Swent: How about goggles?

Ingle: No. Yes, I forgot the hard hats. I started out when we didn't have hard hats, and I started flying when we didn't have helmets. We had cloth helmets.

Surviving Being Shot Down Over Korea

Swent: We can see a picture up there right behind you wearing helmets.

Ingle: Yes. And that one with the big Corsair on the wall? It's a cloth helmet.

Swent: Now it's hard helmets.

Ingle: Yes, now they're hard hats. And fortunately, when I crashed, after I said that prayer, I thought, Well, there's something I can do. I pushed as hard as I could against the rudder pedals, with my left hand I pushed as hard as I could against the instrument panel, and of course I had the stick in my right hand. But it

spun me out of the seat. What I was afraid of was I was going to smash my face against the instrument panel.

Instead of that, it spun me around, and it knocked me out, but I hit where the helmet came down over my ear, see, and that saved me. If I had had a cloth helmet on, I would have probably not made it.

Swent: Actually, I think you told about that crash off the tape.

Ingle: Oh, well, it's not mining, though.

Swent: No, it's not, but we should at least mention it. Were you shot down?

Ingle: Oh, yes, anti-aircraft.

Swent: Right. And the ejection seat didn't work?

Ingle: No. We didn't have ejection seats.

Swent: Parachute?

Ingle: Yes, we had parachutes, and that was one of the problems. See, I got hit right at the end of a reco[nnaissance] flight that followed a strike on enemy positions. I had put my wing man ahead of me because his radio failed, and I didn't want him behind me. I wanted him ahead of me so if anything happened, I would see him. Well, he took a .37 millimeter through his left wing, and I saw it happen. Somebody in the flight hollered to get on him, and I said, "I got him." I poured the coal on, and about that time I took one through the engine.

A piece of shrapnel came through the windshield and hit me in the face, but the worst thing was that immediately oil started to cover the windshield and the whole canopy, and so I had to fly on instruments. I had a chance to see how high I would have to get to get over the mountains to the sea. I had full power on, and I could barely stay airborne. I figured I was going to--I was trying to get to Wonsan harbor.

Then this friend of mine got on my wing, and I said, "Okay, I'm on instruments, so guide me." I figured I wouldn't get to Wonsan harbor. I would not make it that far, and so I was watching the oil pressure and everything, and the oil pressure dropped, and the engine froze up, and there were a couple of explosions, and it caught fire. I asked my wing man, "Can I do any good by staying with it, or shall I bail out?"

I didn't know it, but I was on fire, and he said, "Well, you better bail out." And so I got up on the seat. I undid my shoulder harness and seat belt, and I got up on the seat and looked over the side and was ready to go, and then I saw this village and I recognized it. I had gotten shot up at another time from the enemy in that village. And then I looked ahead. I didn't know I was on fire. I saw the river, and I had read a survival story about this guy who crashed in a river and the levees protected him, and so I thought, Well, jeez, I'll get in the river. I'm not going to hang in a parachute and let those guys have target practice.

So that's when I sat down again in the seat and flew for the river. Of course, I didn't have any power, but when I got to about 500 feet, I automatically started over a check-off list, and the second thing was--well, the first thing was flaps, you know. I put down the flaps. And the second thing was seat belt and shoulder harness. That's when I had the panic. I thought, Boy, I'm going to smash my face in the instrument panel because that was the way it happened.

And then I said the prayer. I said, "Lord, get me home safely to Janet and the kids." And right away, the panic left, and I thought, Well, there must be something I can do. I tried to hold the shoulder harness down, but my gloves were covered with oil, and I thought, Shoot, that's not going to work. So then, like I said, I shoved as hard as I could on the rudder pedals and had to fly with my right hand, but my throttle hand I shoved against the instrument panel as hard as I could.

It spun me out of the seat. I had this guy flying--he's quite a guy, and we still get together about once a year. Anyway, he was flying over me. See, it was the end of the mission, so nobody had any ammunition, and they couldn't protect me. But the enemy didn't know that. I figured there were about 200 troops that had me surrounded.

He said, "Well, when I flew over you the first time," he said, "you were bent over in the cockpit and I thought you were trying to save your maps so you wouldn't have to make up a new set." [chuckles] Well, I was unconscious. But then I came to, and I tried gracefully to get out of the cockpit. I had the life raft and my parachute was still fastened to me, and I tried to get out gracefully. About that time, I heard a couple of machine guns open up, and so I said, The heck with this. I'm getting out of here any way I can.

And then I was in the river. It was probably about a little better than waist deep. Then that's when I walked around behind

the tail. I thought, Well, I'll get over on this side of the airplane and hide between the wing and the fuselage. And so I stopped when I got around the tail of the airplane, and I was bent over. He said, "I don't know what you were doing." Well, I found out I was putting my flight gloves away so I wouldn't lose them. But he said the water was just chopped up. He said, "I don't know how they missed you."

Swent: And then they picked you up with a helicopter?

Ingle: Then I got around the other side of the airplane, and that's the first time--I had designed this survival cloth with which you could point out where the enemy fire was coming from? So I used that. That was the first we carried it. The guy that was guarding the one that I tried to join up on--he had been escorting him back to the carrier. Well, they called him back because he had ammunition, so he came over me in response to this marker cloth, and he opened up with six .50-calibers, and they all fired that time. He opened up right over my head. And jeez, I just about climbed into the airplane with him. It scared me because I thought they were zeroing in on me, on the ground.

So he came across, and this guy, Schipper, kept circling me, but at the level of the top of the levee. He got hit eight times with small-arms fire. I mean, his aircraft did. And then I got so cold that I was shaking uncontrollably. It was shock. And the river was cold water. And so I thought, Okay, I've got to get out of here. I'm going to run for that little bit of rice straw that was inside the levee, and I could hide in there, but I never dreamed that nobody would see me go.

Schipper, instead--he saw my helmet floating up against the wing, and he saw my life vest. I had taken them off because they were bright colored, and I figured they would make a target for the enemy. He came by, and he saw them, and he thought, Well, they've killed him. But he came back again and made another circle, and then for some reason he made a third circle, and then on that third time, he saw I had stirred up the mica in the river sand, and he saw the reflection of the sun, and so he called and he said, "I don't know exactly where he is, but he's over on the west side of the river."

And so the helicopter came in. I wasn't expecting him that soon. I was lying there in the rice straw with my .38 and wondering what was my duty--take as many of them with me? But I had about ten or twelve rounds. I thought I won't survive it, but what should I do? About that time, the helicopter came over. He came right over the top of me, and he didn't see me.

When he came over, I jumped up, and I had one flare left, and I set that off. I don't know--except the Lord was watching over me--I don't know why nobody could hit me. I don't know why because I wasn't very far away. The river wasn't too wide. He spun around. I'll never forget. He spun around on that rotor and came back towards me, and he had the sling down. You see, in the Navy we used a sling because we had to pick people out of the water. The Air Force landed on the ground.

The pilot of the helicopter--he said, "You know, I didn't hoist you. You came up that little cable hand over hand." Well, I felt--I mean, there was an old chief in the helicopter, and the pilot. They had several extra guns. I thought, Jeez, I can hold off a whole army now. And I landed--it was the helicopter from the battleship *New Jersey*, and so I got aboard the *New Jersey*. And then it was almost more scary that night because I had to transfer to a carrier in a breeches buoy, and it was black as the inside of a hat. And they were trying to maintain flank speed, and this destroyer that they were trying to put me on kept coming in to the battleship, catching the bow wave.

Finally, the propeller guard on the destroyer hit the side of the battleship, and so then they slowed down because, boy, that breeches buoy was going down into the water and then coming out. So I was more spooked of that than--well, anyway--

Swent: That's all pretty important.

Ingle: Well--

Swent: It changes your life.

Ingle: Yes, right. They say when you face death right in the eye, it always changes you. It just does something to you.

An Engineering Partnership with William Kritikos

Ingle: Well, let's see. You've got "engineering partnership" down here. That was--well, Bill Kritikos was my partner. His brother had a couple hundred thousand dollars, and he wanted to invest in a mine, and so Bill and I started looking for a suitable property. Bill was a little bit impatient. I mean, he thought you could find a mine first shot out of the bag. There was one mine that interested me on the Mother Lode, and that was the one that Fran Frederick told me he had made this contour map in the plane of the

vein, and he said every place there was a little dimple in the footwall, there was an ore body.

So I was pretty interested in trying to find something we could get at. I mean, there was a lot of water in the mine. The one thing that bothered me was that Fran in his report had written that there had been--a dike invaded the vein system in the lower levels of the mine, and so part of the ore was cut out. Fran had thought that if you went deeper, that dike might fade out. But we didn't have enough money, I didn't figure, to go deeper.

So I worked down there for about a week, and--

Swent: What mine was that?

Ingle: It was at Coulterville. I can't remember the name now. But anyway, Bill was actually a little bit more interested in tying up his brother's money.

I said, "Well, there's no point in pursuing it" because this lawyer had it, and he wanted too much money up front. We didn't have enough. I figured if we could find something closer to the surface, why, we might be all right. It was a pretty flat-lying vein. It was a mine at Coulterville. I believe that's right.

Swent: Did you find a better one, then?

Ingle: When I was in school, there was a little silver mine up at Leadville, Nevada. The description of it intrigued me. I had remembered it ever since I was in school, and I told Bill about it. We went up, and Leo went up, and Hughie and Dick went up with me--

Swent: What was Leo's last name?

Ingle: Zeltner. We went up, and we laid some air line into the mine because there was a long drift, and it had bad air, and so we took the compressor up there and we took plastic, PVC air line, and we laid air line clear into where this winze was. The mine had been a good, rich little mine. The head of the School of Mines had written it up and thought well of it.

There was some ore left in the upper levels--not the best ore, but it was good enough. So we laid this PVC line in there. And jeez, poor Leo--he had to get right to the end of the pipe and breathe. The air was bad. And so we got in to where this winze was. The winze was 900 feet deep, I think, and we got in there, and it was full of muck. I mean, it was about like that cross-cut at the Corona--full of slop.

So then after that, I got hold of a report by Burgess, and part of it had been quoted in the publication of the School of Mines--or in the state--I guess it was a state publication, Nevada publication. But I had only gotten part of it. Then I got the full report by this guy, Burgess. He was supposed to be a real good geologist.

On the basis of that--you see, the ore body was cut off by a dike at the west end. I mean, they never penetrated the dike, so you don't know whether there was ore beyond or not. But on the east end, the ore body--the ends were almost vertical. But they got down--and I think it was between the eight- and the nine hundred-foot level. They showed--well, Burgess reported that they had gotten down there with the winze, and then they had drifted out on the side where ore should have been, right next to the winze.

He reported that they drifted out a couple of hundred feet--I mean, I can't remember for sure, but anyway, they drifted almost half the way to this other dike, and then they put a raise up about thirty feet, and they hit the ore. But in one level, a hundred feet, the ore body had shortened by half. And I said, "Boy, that's no good." It would be too much work, and if that continued, the next level wouldn't have any ore.

And so I told Bill, and I think Bill thought--I mean, we were good friends, but I think Bill thought that I was going to try to get hold of that mine myself, because I had had so much faith in it. Anyway, his brother decided that Bill ought to make the engineering decision, so I said, "Okay," and they bought the property, and he could never do anything with it. He asked me to examine it, but he had another geologist in there, and I said, "Well, that guy has spent more time than I have there, so you ought to go by what he wants." So he didn't do anything with it.

They still have it. In fact, his widow has asked me if I knew of anybody that would be interested. On those kinds of--like, we've got this little one up here. But it's got a better chance than that had.

Swent: Which little one are you talking about?

Ingle: Out here, the Mabel. So that was my reasoning. And I never got to tell his wife. Hughie and I didn't get to visit her. We tried to, but if I go back for a while, I want to get--and tell her why I thought it was no good and I changed my mind on it, because I got the full deal and boy, it would have been very expensive, and you would have had one level of ore, and that was it.

So that's "engineering partnership," and that was the dissension. I was sorry because Bill and I really liked working together. But he said, "Well, I kind of thought that would be your answer." We had looked at a number of things, but--

Powerine Oil Company and a Disastrous Copper Project

Swent: What was Powerine?

Ingle: That was a little oil company that was down in--ah, what's the name of it?--down in southern California in the L.A. area. I can't remember the name of it. It was a suburb of it, but I can't remember the name. But anyway, Jack Knaebel was a consulting engineer for them.

Swent: Is that the Jack Knaebel that was with Anaconda?

Ingle: Yes. He's the one that discovered--

Swent: Jackpile [Mine].

Ingle: Yes. You see, the chief engineer for T-K Mines was his brother. He was a real nice guy. They called him "Chid" Knaebel. His name was Charles P. Knaebel. So anyway, he had an agreement with them that he was to find a mine for them. He had a--

##

Ingle: So anyway, this little oil company had gotten a report from this geologist on this little mine. I can't remember the name right now. But anyway, it was over a pass out of Big Pine, California. They had gone ahead and made an agreement with this guy, this so-called metallurgist, that they would put up a plant--

Swent: This is a copper mine?

Ingle: Yes. This guy had a really good reputation, and he had a Ph.D., and he had this new process that was--oh, what do they--

Swent: A kind of leaching?

Ingle: Yes, it was going to be leaching. And so they had gone ahead and spent a lot of money on development of this mine, and they had built this plant. Then the superintendent for the plant wanted to quit. Jack had to come into it kind of late in the game. The

plant was put up and, boy, it was lousy. He wanted me to go down then and take over. Hughie was going to be the assayer.

We went down, and I guess maybe I shouldn't expose this. I don't want to have any recriminations with any of these people, but the father of this Ph.D. was out there to see that everything went right. Jack put a guy in he had known for a long time. He put him in to build the mill and use this--oh, what did he call it? Anyway, it was a shallow-bed leaching, with acid.

I went down, and the plant wasn't built right. The metallurgy that--they claimed it would have to be exact, you know, the acid and everything. I questioned this guy, the Ph.D., and he would write this report and say, "Everything has to be measured precisely." And they made no means for doing that. I said, "Well, how are you going to measure this?" And, "Oh, well, that's not important."

They were going to use a--jeez, an ionic transfer of some kind that I didn't understand. I wrote it up, and I read about this report, and all these things had to be exact. And there was no way of controlling it.

Swent: Solvent extraction? Is that it?

Ingle: Yes, that's right. Solvent extraction. I got this former Anaconda guy to come over and tell me, "Does this look like it's going to work?" And he said, "No, it won't work." It was just a total disaster. I agreed to stay there until we got the plant built, but I said, "I don't want to be here afterwards because it's not going to work, and I don't want my name hooked up with it." And Jack had a falling out with him.

Then he wanted me to quit, and I said, "Well, jeez, I can't, Jack, until I get it put together. But it's not going to work." Oh, the plant wasn't built right. We had to take out some of the equipment. It was worn out, and I got some other equipment from Darwin. The process just wouldn't work.

And then they had got this expensive liquor in for the ion exchange. I've forgotten what it cost, but it was fabulous. And then they filled these horizontal tubes--after I left--they filled the horizontal tubes, and they leaked, and all this expensive stuff was running down the hill, and they were trying to dam it up, and the crew--I guess I shouldn't say any more. Just say it was a disaster.

Swent: But when you say a plant is built wrong, what--

Ingle: Well, for instance, the discharge onto a conveyor was too close to the tail pulley, so all the muck would fall off the back end. I mean, there would be a lot of spillage. And then the main crusher--we had to discard it because it was worn out. The parts were worn out. It wouldn't do the job. You had two leach beds, and you were supposed to monitor each one separately. Well, the fluids joined together, and you started one before you started the other, so you couldn't tell which one was done and which one wasn't because there was no separation, and you had no way of monitoring the acid that went into it.

And this guy had a reputation. I mean, supposedly he built these plants all over the world. But, you know, the money was handled poorly, and it was just a disaster. And it was a good little company. I tried to get them to pull out of it. I said, "If it's successful, you don't have any ore."

I understood that they dug a lot of those deep shafts in the 1920s, I think it was, expecting to find a big ore body down deep. Hughie and I rehabilitated a thousand-foot one over by Gabbs, and it was the same basis. They had a showing on the outcrop, and then they sank a thousand feet, and some of them were fifteen hundred feet, and they expected to get an ore body, and they didn't get it. They just had a little showing at the surface.

This one was the same way. I went down in the shaft, and they just had a little stope, just a handful. They had a little surface showing, and they had expected to get all kinds of ore. I told them--I said, "If the process works, you don't have enough ore. Move someplace else." They were in a bind. They had made a commitment. I always think when you see money being wasted on a hopeless project, it makes you think, Gee, whiz, I wish they would put their money where they had a chance of making it. But I don't know--they get tied into these things, and they won't quit.

Swent: A lot of wishful thinking.

Ingle: That's right. And then they had been misled. I don't know whether I ought to say some of these things. I don't want to cast a poor light on anybody, unless it's for a specific purpose. I don't want to do it just to be bad-mouthing somebody.

Swent: Of course not.

Ingle: Maybe I'm saying too much.

Swent: No, I don't think you are.

Ingle: But this happens over and over again.

Investigating a Placer Mine in the Desert

Swent: That's why people hire a good consultant.

Ingle: But the thing is--well, I went down--let's see, who was--a couple of guys came to me that had a placer down in the desert. They wanted me to go down--now, the promoter had put in a couple of tables, concentrating tables, and was mining this placer. He wanted some money to expand the operation, and he had these tables in, and he wanted--these two backers, then, they had--I asked him how much money they had in it. At first they said, "Well, about \$80,000."

So I went down. The government had drilled some holes large enough for me to get into a cage and go down and take samples. I went down, and I spent a full day hanging in that cage and cutting samples. These were strategic drill holes, I figured, and they had been done years and years ago. I brought the samples out, and this guy was anxious for me to run his little plant. I said, "Well, if I have time." But I didn't want to because I knew that he could salt the plant, and then I wouldn't know where I stood.

So I took my samples, and John Wells and I ran them. Johnny just helped me because he had a little plant we could use. I wouldn't use the guy's little mill. He said, "Well, then, do you mind if we run some stuff?" I said, "No, go ahead." Then also I looked over the ground, and the tonnages, cubic yards--the bedrock was sticking up in a lot of places, so it was shallow. Somebody had sunk a well out in the flat, and it went--I don't know--a couple of hundred feet. But you knew that they didn't have the yardage. There was too much bedrock showing.

I came back, and Johnny and I ran those samples. Of course, we didn't get much gold, not enough to--and so I wrote a report and told these guys that they don't have the yardage. And these drill holes were strategically placed so that if there was going to be any gold, it would be in some of this ground. So anyway, I wrote this report and turned it over to them, and they said, "We wish we had taken you down before we put any money in it." Then I found out they had a couple hundred thousand in it.

They asked me if I would come down to San Francisco airport and meet this promoter when they handed him the report. I said, "Sure."

So they gave him this report. They said, "Now, we want you to not let his wife get you in a corner and start talking to you. We want you to listen to what he tells us."

I said, "I won't have to." I said, "You just listen." I said, "Most promoters can't stop talking, and so eventually he'll double-cross himself and contradict himself, and so you just listen."

When we got through, he did so. We had coffee afterwards, and they said, "Well, you were right. I wonder if we bought that mink coat that his wife was wearing."

What is so amazing is that so many times they have so little. I mean, you can almost go out anyplace and find values as good as these guys come up with.

Swent: But they convince people.

Ingle: Yes. I guess it's like the stock market.

Swent: The lure of gold.

Ingle: Yes.

Hornswoggled at the Talc Mine

Swent: What about industrial minerals? We haven't talked about that.

Ingle: Well, the only experience we had with industrial minerals was with the talc. We built a sorting plant. They were supposed to furnish everything and put it on the property. Well, we had to go and get the stuff, and we built the plant because they had said that they had all these reserves. When we got to working in the mine, we got suspicious that a lot of this wasn't talc. They had had some good engineers in there, and so we kind of took it at face value.

But the thing was that a lot of talc showed. But there were big boulders of granite, unaltered granite, and the talc was on the periphery, and the talc--it had no asbestos in it, so it was good cosmetic talc. But then I sampled--to prove it, I went through--and Hughie went with me, and we sampled some cross-cuts. We chipped the periphery talc off of it, and then we had the granite.

I think I calculated how much talc there was, and there might be 10 percent. Well, it was supposed to all be talc. And so we got hornswoggled on that, but we had the accident, and we tried to get them to drive another drift. They didn't want to do it. They

wanted us to go in over the top of the old stopes, and we wouldn't do it. We wouldn't take any equipment in over the top.

But they had had some guys that I knew in school, and they were pretty good engineers. What they did was they went into this talc body, and then they took the heart out of it. And then they made it unstable for the rest of the mine, and so that was lost. And they backed out and pulled talc out as they backed out, so that enlarged the drift, and then the whole thing collapsed.

There are a lot of things you have to take into consideration. That's our only experience--but their own guy that was running the mill for them, he told us--he said, "That's the best talc that we ever got out of the mine."

Because we were real careful. But we put the fines in. They wanted you to segregate the fines. "Well," I said, "the fines are going to be the best stuff." And so we put it in, and this guy milled it and said that's the best they had ever gotten.

So we've been successful in some ways, but not particularly monetarily.

Swent: Well, I'm sure your values were different.

Ingle: Yes, that's true. I never tried to promote anybody. If I thought it was bad, then I told them, flat out. And I told them the reasons. Well, like I say, some of them got mad because their balloon was busted, and they went on with their own plans and lived to regret it.

Service as Nevada Mineral Resources Commissioner

Swent: When did you go on the Nevada Minerals Commission?

Ingle: Oh, let's see. My term ends June 30th, but they want to put me on again.

Swent: You're chairman?

Ingle: No, no, no. I'm just one of the commissioners. I'm president of the Miners & Prospectors, and I have been for several years. You're not supposed to succeed yourself, but nobody else wants the job.

Swent: Okay [chuckles].

Ingle: We had--oh, about four hundred members a few years ago, and we're down to about fifteen now because people dropped their claims and there's no more small mining. I think I picked up the end of somebody else's term, but I've been on there a little over eight years, I think. Our job is to promote mining. We are strictly funded by fees that the mining industry puts up. Now, when things are a little tougher, we have to raise the fees a little bit to keep in business.

It's a paradox, and I don't like it because the industry is in bad shape. It isn't the time to raise fees, except that, like the environmental group--they had a five-year permit for a mill for the air pollution. It was \$700; now it's \$2,000. So all these things--they work against what you're trying to do. Of course, with the new 3809 reg[ulation]s, I think it's a disaster if they put it through.

A Bout with Cancer Delays Work

Swent: Let's talk about your mines down here, the Mabel and the Ashby and the Garfield. Maybe you can bring in how these things have affected you there?

Ingle: Well, for one thing, we figured we have 10,000 tons in the dump.

Swent: At which mine? All three?

Ingle: Well, no, at the Mabel. So we built the mill with that in mind, but unfortunately, about the time we got the mill, I got cancer. I had to have about a year's--oh, what do you call it?

Swent: Chemotherapy?

Ingle: Yes. About a year of chemotherapy. See, I had cancer of the bladder, and then I got prostate cancer, and they couldn't operate until they cleared up the bladder cancer. They tried three different chemotherapies on me. The first two were the most expensive but had the least likely success. The third was the cheapest, and it was the one that worked.

So then I had the prostate operation. The cancer--they weren't able to get it all, so then I had to have radiation to try to clean up the cancer--I mean, the prostate cancer. The bladder had healed--except that then, when they did the radiology, they damaged the bladder. There was an artery that was almost exposed.

So I started bleeding twice, and they had to get me to the hospital.

The urologist--all they could do was cauterize it. The second time, he said, "We really cooked it." I had to come over from the mine, and both times I started bleeding, and then I would get a big blood clot, and I couldn't urinate. He said--oh, doggone it, what's the term? Janet would know. She's better at remembering that stuff than I am. But--no, I can't remember the term. But anyway, it consists of putting you in a tube, and then increasing the oxygen pressure.

Swent: Oh, yes.

Ingle: What do they call that?

Swent: Hyper-something, is it?

Ingle: Hyperbaric, I think it is. Anyway, they had just started a new unit in Reno, and they hadn't done this before. They didn't know whether it would work, but under the conditions, it was a healing process. The only thing is that they said--I think it was 1800 times the effectiveness, except where you had scar tissue. And, of course, this was scar tissue.

Swent: You had a lot of scar tissue.

Ingle: Yes. So anyway, I went up and took the treatments, and it did it. Now I've got to go in tomorrow for another checkup. They use a--oh, they'll peek into the bladder and look around, and then I'll get a PSA. I've been free of it for--oh, I haven't bled in about a year and a half.

Swent: Oh, that's wonderful.

Ingle: And it looks good. But you can't ever tell, except the Lord knows, so I'm counting on Him. It really zapped me and took the energy out of me. Janet and Hughie thought I was going to die because I was out at the mine, taking this chemotherapy, and I just got so I could barely drag myself a hundred yards to the trailer.

##

Swent: Well, it certainly sounds as if you have gone through quite a time there.

Ingle: Well, it was not as bad as some but worse than others.

The Mabel Mine Holds Promise of Good Ore

Swent: So this happened just as you had finished the mill.

Ingle: No, just as we started. And that's why it has taken so long and why we didn't get the dump run before the price changed. Now, if you wanted to turn that off and take a look at some maps [leafing through maps]--I don't know whether you want to or not. But these are the Mabel maps. We have the old ones. I can show you. I've got cross-sections on the top here. Let me see.

Swent: Is my stuff in your way?

Ingle: Let me take these paper ones, these cross-sections off and scoot that stuff back over there. Is that enough for the interview?

Swent: No, not quite. What I was thinking was that maybe we could use some of your experience here as an example of what you do at the Mining Commission or what some of these regulations--how they have affected you?

Ingle: Well--

Swent: How did you acquire these leases? Is it a lease?

Ingle: No, we made a purchase. We've got a couple of partners that put up some money, oh, several years ago.

Swent: You actually own this, then.

Ingle: Yes. We've got five patented claims, and then we've got twenty-eight unpatented claims between the Mabel and the Garfield and the Ashby.

Swent: You were telling me last night that the Garfield is probably over a hundred years old.

Ingle: Oh, yes. I think the 1880s were when it was mined, mainly. It has some possibilities. They figured the mine was bottomed, and we have done some work, and we don't figure it is. But that's kind of a little bit more of a wild shot than the Mabel. But let me--

Swent: How old is the Ashby? Is that an old one, too?

Ingle: No, that wasn't discovered till the thirties.

Swent: And the Mabel?

Ingle: The Mabel--they were working it in 1921; West End Consolidated, Tonopah, took it over. They started producing and they made money right from the start. They developed it to the 700 level, and they took it when it was at the 200 level. Let me--

Swent: But they had no processing plant.

Ingle: No, it was straight shipping ore. But they did use their mill down at Tonopah. I'm not sure whether they milled any of the Mabel stuff at Tonopah or whether they direct-shipped it all, but I've got some records of some of the shipments the lessees made. Their mill, the way I understand it, burned in about 1929. Then they stopped developing--let me see [continuing to leaf through maps]--this may be--I'd like to be able to show you, and I don't want to disrupt things too much. But I'm really enthusiastic about this, despite the fact that we haven't made any money yet.

Maybe that will be far enough to get an idea. I've got--see, we've got each level segregated here, but then we've got a composite. This is the Mabel one, and these are the cross-sections. Over on that far end, you see--let me see.

Swent: Do you want me out of your way here?

Ingle: Well, no, no, that's all right. I just wonder where--

Swent: What we're doing here is we're looking at a whole stack of maps.

Ingle: Let me see if--

Swent: We can move this.

Ingle: Okay, we can move this a little bit.

Swent: There we go.

Ingle: Now--

Swent: That plastic got a little wrinkled there. Maybe you want to start all over.

Ingle: Yes.

Swent: Plastic has been a great help, hasn't it?

Ingle: Oh, yes. Before that, these linens were great.

Swent: Now, these are linen maps that you're looking at.

Ingle: Yes.

Swent: But then he has a heavy sheet of transparent plastic protecting it. There we go.

Ingle: I should have had this junk--

Swent: It's okay. And then on the bottom you've got a paper composite map of all of them.

Ingle: Now, let me see now. I'm looking for the stope map. I've got a linen--doggone it, I'm not sure where it is right now. But anyway, I've got the geology. But this is the 100 level, and this has been stoped here. And then the vein disappears. Then they cross-cut back here, and they found the vein again. This is healed right here. And the same thing happens over on the other end of the stoping. And so we've got evidence here that supports what they suspected on the other end. They got to the 500 level, and they kept hitting this acute-angle fault, and they thought that was the vein. So then on the 500 somebody decided that that wasn't the vein, and they cross-cut back, and the same thing happened as here. There the vein was, right where it should be, except that it had healed, and you couldn't see any sign of it. Then that area has never been worked.

Swent: And this is only 500 feet down.

Ingle: That's on the 500 level, yes. The stope map would show you that the ore is only shaped like that [demonstrating].

Swent: Like what?

Ingle: Well, kind of like a triangle.

Swent: Or a cone?

Ingle: Yes. And the stoping is limited by that fault on that end, but it comes beyond the fault on this end, and so we have open ends on the thing.

Swent: And these are all stopes that have already been worked.

Ingle: Yes. You see, this is where we are, in this little incline shaft. We're going to try to get down now to the 500 level in this shaft. We went over on the 300 level, hoping to prove whether we could open this shaft, this one here. We had backing until we got within twenty feet of our goal, and then they pulled out. So anyway, it has been a long struggle. We built the mill, and we're pretty proud of it.

Swent: What kind of mill is it?

Ingle: It's a flotation gravity mill. We didn't use cyanide, and that was better metallurgy, but we didn't use cyanide because it's so bad socially. We had some ore run from this dump by Sunshine, at their mill at Silver Peak. They paid us 95 percent of the gold and 78 percent of the silver, something like that. That's a pretty good recovery. But anyway, there's still a lot of work, and I'm hoping I can hold out until we get it done.

Hughie Ingle, Invaluable Helper

Swent: You talked about Hughie a lot, but you haven't said--he was in the navy, but he also went to college. Did he go to Mackay also?

Ingle: Yes. Well, he went--let's see. He went I think a year and a half to Mackay, and then he went--we got short on money. You know, the mercury went to pot. And so we had to shut down. We had to then have him go to junior college. I think he had one semester, and then he had to drop out to earn some money, and the Navy drafted him. He was number six on the list.

Swent: Oh, my.

Ingle: And then he decided he didn't want to go back.

Swent: Go back to college.

Ingle: To college, yes.

Swent: Where was he in the navy? You mentioned Moffett Field, but--

Ingle: He was in a patrol squadron. He learned what he thought we would need in mining--mechanics--and since then he has learned welding and everything. He did go back up to Mackay to see about enrolling, and things have changed. See, the education I got was entirely different than they get now. I got hands-on stuff by people that had done it.

Swent: And he had already had all of that, of course.

Ingle: Yes. But, I mean, he likes to do the physical work and to work out these problems. There's too much theory. It's like John Livermore says, "These guys, when they come out of college now, they expect to be manager on their first job." When I came out of college, they said, "You won't be worth your salt for two years,

and then you'll start being worth some money to the company." That's a different attitude.

Swent: Right.

Ingle: And then I'm sure that your husband knew also--

Swent: He started as a mucker.

Ingle: Yes, yes.

Swent: That was what you did.

Ingle: And then he probably didn't want to be kicked upstairs, either. I mean, he probably would have liked to stay in the mine.

Swent: He liked the operating.

Ingle: That's what our problem is today, now. We don't have mining people running the mining companies. We've got business majors and lawyers, and they don't understand mining, and they don't care, and they don't have any loyalty to mining. So a mine shuts down, and they go take another legal job or another business job.

Swent: That's right.

Ingle: And us diehards enjoyed the mining. That's why we wanted to stay in it. I think it's true in everything. Now, you see, Dick's experience--there isn't a medical person on the board of directors at the hospital in Winnemucca. Up where he went now, there are two or three doctors on the board of trustees. But now these HMOs--they more or less tell the doctors what they can do. I mean, it's a dollars-and-cents deal. If a doctor wants to do something, then they have to decide, well, whether they're going to make money or not.

The Crippling Effect of Regulations and Taxes

Swent: You mentioned this 3809 regulation.¹ How will that affect you here?

¹Refer to appendix letter written 13 October, 1999, for information on the effect of regulation 3809.

Ingle: It will affect us in that we're under a notice of operations now. I don't know whether you know what that is. If you don't disturb more than five acres each year, you can operate under a notice level. That means that exploration can operate under notice levels because they disturb less than five acres.

Swent: And underground? Your underground work doesn't count against that?

Ingle: No. But they're trying to get to that problem, too. Now they want you to--under a notice level, you don't have to have a bond. Now they're going to--if you've got any kind of mill at all--except for, I guess, a straight gravity would not be under the new regulations--if you have any mill at all, one ton a day, then you have to have a plan of operations, and that takes time, it takes permitting, and you have to have a bond.

The bond--it was so that you could get a bond by making an estimate of what reclamation would cost if you did it yourself, and then you had to put a bond up to cover that. Well, now they want to make it so that the bond has to cover the cost of BLM getting a contractor to come in and do it. You see, that gets way out of sight because you can't say, "Well, I've got a dozer here, and I can do that work."

Of course, then you have to pay BLM a hundred dollars a claim per year, for any unpatented claims. That was the first blow because the little guys did assessment work instead of paying, but now you've got to pay.

Then there's a lot of other things. They figure that under this new 3809 regulations, it will cost Nevada \$93 million per year in lost production. But industry figures it can be five times that much. In Nevada, all these little outlying towns and counties--the cow counties, we call them--that is one of their sources of revenue, the taxes: net proceeds tax and everything like that. Well, okay, so all they're doing is eliminating jobs.

What they want to do is if they have a BLM inspector go around, they want to have it so that they can have a civilian accompanying him. And so who's going to do it? The lawyers like are after John Livermore, and they're going to be nitpicking and looking for stuff.

Swent: Now, is this all on BLM land?

Ingle: No. The Mabel is, but this is the mine here [showing location on map], and then this is patented. We've got five patented claims over here. The Garfield is pretty well covered by patented

claims, but there are peripheral claims that we hold. We've dropped half of the unpatented claims that we had.

Swent: But you have to pay a hundred a year on the others that you still hold.

Ingle: Yes. So that's \$2800 we pay. We pay \$1000 a year in taxes on the mill. We just got billed for a sanitary landfill in Mineral County. We got \$288 times two. We don't use the sanitary landfill. We have to appear every year, and we get it cut to \$96. But they bill us unless we appear and protest.

Swent: That takes a day out of work.

Ingle: Yes. And then we have to pay--well, they're going to raise the fee to \$3.50 a claim to file with the county recorder on patented claims. We also have to pay taxes on the patented claims. We have to have a business license. Oh, let's see. What else? Anyway, it costs us quite a few thousand dollars a year, whether we produce anything.

Swent: And this is all before you're even getting anything out of it.

Ingle: Oh, yes. I mean, whether you produce or not. And then they want to put a federal tax on it now, royalty tax. Then if you're paying a royalty to some property owner on top of that, then there's not much left.

Swent: So if all goes well, when do you expect to be in production?

Ingle: Well, we've got to go back with John.

Swent: That is, going back up to work at the Corona.

Ingle: Yes. Or Hughie does, anyway. And so that's delaying us. We spent all this time putting all the equipment back in shape because it had been sitting so long. And then, you know, we've had problems. We've had to repair some stuff. On the loader we had to put about \$4000 into that.

Swent: And when you're not there, there's the risk of theft, I suppose. Vandalism.

Ingle: But we trust in the Lord.

Swent: That's all you can do.

Ingle: Nobody has bothered any--well, they did steal about a three-hundred-dollar sheave up at the Mabel, and they stole a bucket. But, you know, we haven't been seriously hurt by that.

Swent: You leave your trailer there, for instance.

Ingle: Yes. And we have to pay a tax on that. And then we have to have this permit for air pollution. We have to pay \$250 a year as a maintenance fee for the permit, and then every five years--now it's going to be \$2000. You know, you begin to think that the best thing is to stay home in bed, and it won't cost you so much.

But I wish we had time to show you why we feel that we've got a chance. See, this is the end line [showing it on the map] of the patented claims. This area in here has not been mined, to our knowledge. We don't know what the story is, but on the 400 level, the vein is out of place. See, it's dipping this way, except it takes a reverse dip on the 400 level, and there was good ore on that. So we are going to try to get down here. This is the 300 level and it goes a little bit below that. But we're going to try to get it down to maybe the 500 level and find out what the heck is going on with the 400 level, why it is stepped back. And the cross-sections indicate it, too. I mean, you can see.

One thing about this Mabel: it's got a lot of small cross-faults in it. Where you get those, you usually get high-grade ore. Well, they sank the winze over on that other end. They sank it on fifty-ounce gold ore, and it was as good at the bottom as it was at the beginning.

See, now, here's--[moving away from the microphone momentarily as he reaches for another map] and we figure also that--see, this is the 600 level. I'm sure that they followed the wrong vein. They should have been right close to the shaft, but they came out here, and they followed what we call the hanging wall vein. And then they finally realized their error and cross-cut back, and then they sank this winze on fifty-ounce ore.

And so it has been a high-grade mine. The best grade they took out was four cars of 500-ounce gold.

Swent: Oh, my!

Ingle: And then there's high-grade silver in it, too. And it varies. Sometimes it's all silver, and sometimes it's all gold, and sometimes it's mixed. So anyway, we don't know whether we can hang on long enough to--

Swent: Oh, I hope you can.

Ingle: If the 3809 goes through, why, I don't know. It will take us out, probably, because we just can't--you know, I'm on retirement pay from the navy, and then Social Security. If we quit everything, we would be in pretty good shape, but we're trying to do something instead of sitting on our rumps and do nothing.

Swent: Did these maps come with the property?

Ingle: Yes, we got them all. In fact, we had a tough time getting them all because a lot of people--maps are to burn. Then you don't have the background, and if you don't have the maps and the workings are caved, you don't know what you've got. We have some reports--like, we've got all the assays down in that winze. They're pretty well proved because they're not just cut as samples. They're several tons [of them?]. They had them listed as an ore bin on the level, an underground ore bin, and how many tons, and that sort of thing.

I figured at one time, and I can't remember what the price of gold was, but at one time I figured that little winze--and it's probably a four by six, maybe--at the prices at the time I figured, they would have made \$3000 a foot. But it has taken us too long.

Swent: Gold is way down now.

Ingle: Yes. But still, if we could get some good-grade ore, one ounce or better--now, when they cross-cut back and found the vein on that end, the report that we read from Budelman, who was the superintendent down at Tonopah, it only ran an ounce, so they didn't mine it.

Swent: That would be pretty high-grade today.

Ingle: Sure. I've sold myself on it, and I've sold Hughie. Janet is shaking a little bit now [laughs], but--

Swent: It's pretty exciting.

Ingle: It is. Like I say, it means as much to us as medicine means to Dick. And, you know, it's like the loggers. They were going to shut down a lot of the--

##

Ingle: They like gyppo logging. That's what their life is. And they've just about killed it with the spotted owl and all the other excuses they've got.

Anyway, we're ready to sink or swim on this thing now.

Swent: Do you have any other employees, or just you and Hughie?

Ingle: Well, we've had in the past. We've had some, but you don't find people that are willing to work hard, even if they've got a share. I mean, the young people today--and even my grandson noticed it. He worked at McDonald's for a while. He's going to graduate from college--on the 21st, I think, of May. He worked at McDonald's for a while, and he saw--he said, "Jeez, they don't show up, but they don't call in."

Junie sees it in her work--the nurses. Some of them don't keep the records up. They leave the records for the next one to take care of. And they don't call in if they're not going to show up. They just--no sense of responsibility.

Swent: It's pretty hard to run a business that way, isn't it?

Ingle: Yes.

Swent: Well, if you get going, you'll have to hire other people, won't you?

Ingle: Maybe. But, you see, if you hire somebody and they go underground, then you've got all the rules and regulations. It's like we were going to have to go three days to Winnemucca to get this safety training that you have to have annually. Now the state inspector set it up so we don't have to. We have to go one day. But it's human nature that when these people start, when these bureaucrats start, then they can think of so many things that people should have to do.

For instance, we've got to run an opacity test on the mill. That's the dumbest thing--

Swent: Opacity?

Ingle: Yes. They don't use any instruments; they just come out and observe. Then they give you a figure for the opacity, which means the dust load that you have in the air because of crushers and stuff like that. Well, it's an EPA thing. It's a federal thing. This one outfit was going to come around and teach people to run their own tests--and it's a one-time thing. But they were going to charge \$200 a day, and then you just observed. You just observed. Well, we're going to have the state do that for us. They agreed.

But there's all kinds of little things, and then if you slip up on one, they're authorized to fine you as much as \$5000 a day.

Swent: Oh, my.

Ingle: As long as the discrepancy persists. So you don't know whether it's too hazardous a game; you ought to just quit and let them go dig for the ore in China.

Swent: That's where they'll have to go, I guess.

Let's see. I'm looking here to see--I think we've really pretty well covered the ground. Maybe we're deep enough?

Ingle: Yes. The Commission on Mineral Resources--

Swent: Is that what it's called, the Nevada Commission on Mineral Resources?

Ingle: Yes.

Swent: Okay, I had the wrong name.

Ingle: I think that's right.

Swent: Do they pay you anything to be on that?

Ingle: Eighty dollars a day, once every three months.

Swent: Oh, wow.

Ingle: And then you get your expenses.

Swent: It doesn't offset 3809!

Ingle: No. They have limits, like on your room. I can't remember, but it's not very much. But the commission is supposed to promote mining in Nevada. That's our goal, and so all these things, like this 3809, that does not promote mining in Nevada. It's a negative force. We can advise the governor on how we feel and what he should do. The Democratic governor was pretty good on mining. The new Republican governor--I think he will be. We haven't seen him under fire yet.

Swent: Is there any conflict with the gaming people? That's the other big source of money in Nevada. You don't compete with each other, of course.

Ingle: No, no. Mining is the second-largest industry in Nevada, but gaming dwarfs it. And I don't know--this new governor was supposed to be in the pocket of the gaming people. I don't know whether he is or not.

Swent: That doesn't prohibit being favorable to mining.

Ingle: No, that's right. It is so important to the rural counties. If things get too bad, I suspect that the Las Vegas people will have to pick up part of the load for the rural counties because they can't go broke, you know.

Swent: So that would be in their interest to help you a bit.

Ingle: Yes. By and large, the state people--the mine inspectors and the EP, the environmental people, state people--they have been very supportive. The environmental people really--some of these things disgust them, and they try to make it possible for us to survive. And they're having a hard time now.

I fully believe that--of course, God can change anything--but I fully believe that unless we have a catastrophe of some kind, that this country is going to go down the tubes because we've lost so much since your generation and mine. We had people that believed in this country, and they believed in doing things that may not have been good for them personally, but they were good for the country.

We had patriotism and loyalty and hard work, and we went through a Depression, and people helped each other. They didn't try to cut their throat or have a fire sale. That was one of the attractions of mining because the ordinary man is willing to help his neighbor. He's not out there to take advantage of him and try to make money over his dead body.

Now we've gotten away from that, and people are so greedy. Look at the ones that want to--well, malpractice for doctors. Look at that. And then malpractice, you could call it, with the environment. People that own the land and it's wetlands, and then they fill it in because they want to build a house, and then they get thrown in jail for destroying the wetlands, which was on their property. And the government wants to be able to buy private land now. They own 87 percent of the state of Nevada now, and they want more.

Swent: Well, it's kind of a bleak future for mining, all right, especially small miners, isn't it?

Ingle: Well, yes, except that things could turn. I mean, look what happened in World War II. All the small mines got going. I asked one of the BLM people--maybe I've told you--I asked one of the BLM people from Tonopah--the BLM comes up with these management plans for these different areas, and I said, "Well, okay, what if we have another situation like World War II, and we have all this ground blocked up so that it can't be mined or anything?"

He said, "Oh, well, then we would forget all about the rules."

Swent: In emergency.

Ingle: Yes. But, you see, as one congressman said when World War II started, "Well, let's get these brass mines going."

Swent: [chuckles]

Ingle: We are educated in the wrong things, I think.

Swent: People really don't appreciate--well, as we were saying yesterday evening, people don't think mining is important. Most people really don't realize that they need anything that is mined.

Ingle: That's right.

Swent: They think of it as a luxury.

Ingle: Yes. And they think you ought to pay the full price. You should maintain the pristine countryside as it was, and you ought to protect all these endangered species, and nature doesn't protect them. I mean, how many dinosaurs do you have around now?

Swent: Not many!

Ingle: Only the miners! They're the dinosaurs.

Swent: You used the term "desert rat." Is that how you like to think of yourself, as a desert rat?

Ingle: Oh, I don't mind. But I know my professors thought they were desert rats. Well, I take that back. We had--Dr. Gianella and Dr. Wheeler were the geologists--and you probably have heard of Gianella.

Swent: I have heard those names.

Ingle: Yes. But they were the only people that the university would hire now because I think Jay Carpenter and Smythe and Claude Hammond--it was Rill Smythe, I think--and Claude Hammond and Walter Palmer

--we called him "Squeaky"--but anyway, those were the kind of people that built the country.

Swent: But they didn't all have Ph.D.s.

Ingle: No. I wonder if Claude Hammond even had a bachelor's degree. But, you see, years ago, before they had normal school for the teachers, if a girl got out of the eighth grade, she could then teach grades behind her.

Swent: Things are certainly so different now.

Ingle: Yes, and you have to have a Ph.D., and the college accreditation is based somewhat on how many papers you write and how many Ph.D.s you've got on your staff, and they can be totally worthless.

Swent: Yes, it's hard to judge those things.

Ingle: Yes. Well, I don't know. I don't know what will turn the tide, but I think something's got to.

Swent: Well, I think maybe we're about ready to fold it up here. What do you think? Is there more that you'd like to say?

Ingle: No, I think I've talked enough.

Swent: We've covered the field pretty well, I think--everything that I had on my notes.

Ingle: Good enough, good enough.

Swent: Okay. Deep enough?

Ingle: Yes. Did you read that book called *Deep Enough*? This guy said--

TAPE GUIDE--Hugh Ingle

Interview 1: November 6, 1998

| | |
|----------------|----|
| Tape 1, Side A | 1 |
| Tape 1, Side B | 11 |
| Tape 2, Side A | 22 |
| Tape 2, Side B | 34 |

Interview 2: April 5, 1998

| | |
|----------------|----|
| Tape 3, Side A | 36 |
| Tape 3, Side B | 46 |
| Tape 4, Side A | 55 |
| Tape 4, Side B | 65 |

Interview 3: April 6, 1998

| | |
|----------------|-----|
| Tape 5, Side A | 75 |
| Tape 5, Side B | 83 |
| Tape 6, Side A | 92 |
| Tape 6, Side B | 98 |
| Tape 7, Side A | 106 |
| Tape 7, Side B | 116 |
| Tape 8, Side A | 124 |
| Tape 8, Side B | 132 |
| Tape 9, Side A | 139 |
| Tape 9, Side B | 148 |

APPENDIX

| | | |
|---|---|-----|
| A | Hugh C. Ingle, Jr. | |
| | Professional Experience Record | 155 |
| | Letter to Eleanor Swent of October 13, 1999 | 163 |
| | Report on Corona Mine from <u>California Journal of Mines</u> <u>and Geology</u> , October 1939, vol. 35, #4 | 164 |
| | Report on Mercury from <u>California Geology</u> , September 1971 | 165 |
| B | Western Mining in the Twentieth Century Oral History Series | 166 |

PROFESSIONAL EXPERIENCE RECORD

HUGH C. INGLE, JR.

12/74-present Consulting Work and Mine Operation

Among the various projects engaged in during this period, the following are most significant.

8/76-7/77 Standard Industrial Minerals

Rehabilitating underground California talc mine, designing and building new screening and sorting plant, and mining talc under lease in lieu of contract.

12/75-3/76 Powerine Oil Company

On a consulting basis, supervised remodelling and construction, including some design, of a small experimental copper leaching plant. Redesigned and supervised the initial stripping and mining of a small open pit mine.

12/74-9/75 Partnership, Engineer Group

Evaluating gold and silver properties in Nevada and California, including literature research to find promising properties. Earned fee as well as participation. Withdrew when dissension developed within group concerning proper professional procedures in evaluations.

8/72-12/74 FMC Corporation, Advanced Products Division

Succeeding positions as Mining Engineer, Senior Mining Engineer, and Chief Mining Engineer working on a \$10,000,000 U.S. Bureau of Mines contract entitled "Inherently Safe Mining Systems". Purpose of the contract was to modify existing coal mining equipment to make it safer without destroying its productivity. Originally headed group to design ancillary equipment. Later advised entire project on design feasibility from mining standpoint, designed mining plans using new equipment, and aided in developing demonstration mines in Kentucky (Island Creek Coal Co., new mine) and Illinois (Peabody Coal Co., Mine No. 10, special section). Prolonged coal strike interfered with completion of final phases of project. Resigned to return to metal mine work and scout for engineer group.

HUGH C. INGLE, JR.

8/68-7/72 Corona Mine and Consulting Work

Started continuous operation of Corona Mine as my own venture. Discovered two new orebodies in supposedly worked out area and discovered one entirely new ore zone. Mined both underground and open pit. Used our own mercury assay laboratory for mine and furnace control. Spent a great deal of time representing all mining interests in the area in an effort to work out water pollution problems with the Water Quality Control Board and the California Division of Mines; reached a satisfactory solution. Continued with consulting work on a curtailed basis. Examined and evaluated numerous mercury mines in the western states and Mexico. Retained as a consultant by Sonoma Mines, Inc. for its Altoona Mine, Trinity County, Calif. until operations were suspended by falling prices. Retained as a mercury exploration consultant by the Monsanto Company during early 1971. Shut down Corona Mine because of precipitous fall of mercury prices.

4/62-8/68 Consulting Work

The following listed consulting jobs were some of those performed during this period. From 2/65 until his death in 6/68 I was associated with Francis H. Frederick, Mining Geologist, San Francisco, Calif. on many varied projects in the mining industry. I appeared in court as a witness in mining litigation. I installed my own mercury assay laboratory to maintain operational control on properties which had no facilities. During the period 3/63-7/64 consulting work was curtailed in order to put the Corona Mine in production.

2/67-6/68 Helen Mine, Inc.

Retained as consultant for the Helen Mine on all phases of underground mining and exploration and on furnacing until ore reserves were exhausted. This mine was a substantial mercury producer.

12/67 Union Carbide Ore Corp.

Examined mercury mine in remote mountainous area of Mexico. Packed in on horseback.

8/67-1/68 Fruit Growers Supply

Supervised mercury exploration program in Siskiyou County, Calif. Mostly air-trac drilling. Did considerable lab work and research to disprove contention that commercial assay methods were inaccurate.

9/66-11/66 Union Carbide Ore Corp.

Designed and supervised emergency activation of pegmatite tantalite operation in Brazil; anticipated production from Thailand had been delayed by Communist activity. Included drilling to outline ore zones, designing stripping program for dozer and scraper, designing mechanical and hydraulic mining program for open pit, and designing, procuring and supervising construction of multiple sluice box, pumping, and hydraulic monitor installation. Design was preceded by

metallurgical testing in the field which determined causes of difficulties in earlier small scale efforts at beneficiation.

12/65-12/68 Almaden Property Holders

Maintained physical and geological maps and other data on mining progress of lessees at New Almaden Mine, San Jose, Calif. Planned new mine openings and connections with old workings to facilitate exploration and exploitation. Made studies of old maps and reports and recommended new projects based on these and current examinations. Estimated costs, etc., and recommended equipment. This mine ranks number one among domestic mercury producers. It was sold to New Idria.

3/65-3/66 Pennzoil

In charge of field work during exploration project at Guadalupe Mine, San Jose, Calif. Compiled data from old maps and records and made recommendations on areas and methods for exploration. Compiled old maps, made new surveys and new maps, both physical and geological, where needed. Purchased equipment, located sites, and supervised surface rotary and percussion drilling and underground long hole drilling programs; maintained and compiled complete operating and sampling records and made weekly reports. Supervised rehabilitation of old mine workings and driving of new workings. Made estimates of costs and time duration for various projects. This mine has been a major mercury producer.

7/64-1/65 American Exploration & Mining Company

Determined methods and purchased equipment for performing discovery work on a large group of mining claims near the Engle Mine, Plumas County, Calif. supervised work in an area largely accessible only on foot. Where accessible, contracted for use of mechanical equipment. During absence of company geologist, supervised diamond drilling program. Mineral sought was copper.

3/63-7/64 Corona Mine

Completed installation of small rotary furnace for mercury. Designed plant layout, equipment drives, etc. Operated furnace and underground mine as family operation. Forced to cease operations because of low price.

8/62-3/63 Union Carbide Ore Corp.

Examination and evaluation of large mineral concessions (approximately one & one third million acres in over 50 parcels) in the Republic of Congo. Minerals of specific interest were columbium and tantalum and their relationship to both placer and lode cassiterite deposits. Made decisions as to how to best check sample to determine validity of previous reserve estimates, and supervised subsequent sampling. Made studies of company reports and maps in Brussels, Belgium, to compile antici-

pated production and cost data. Made recommendations on future mining methods, etc. Three months spent in the field, the balance in intermittent office work. Rated by UCOC as placer expert.

4/62-5/62 Natomas CO.

Examination and evaluation of large deposit of placer magnetite near Coolidge, Arizona to determine feasibility of dredging operation. Determined drill sites and approved type of drilling equipment. Supervised drilling and sampling. Supervised operation of small pilot magnetic separation plant. Made all calculations, maintained all records. Set up assay and testing laboratory and supervised its operation. Made final report. On leave of absence from Universal Silvers Co.

3/61-5/62 Universal Silvers Co.

Assistant superintendent and mining engineer, Reed Mine, Lower Lake, Calif. Responsible for maintenance of mine maps and records, supervision of open pit and underground mining operations, and a part of the exploration program. Ostensibly hired to manage Mirabel and Great Western Mines. Drew up plans and costs estimates for rehabilitation of old workings and for exploration program at Great Western. Mapped accessible workings of both mines and conducted surface exploration program at Great Western. Company ceased operations before plans could be carried out. All mines were important mercury producers.

1/59-11/60 Mohave Mining and Milling Co.

Mill superintendent and mining engineer, Deming, New Mexico and Wickenburg, Arizona. General supervision of 300 tpd gravity (HMS, jigs, tables) mill at Deming, including maintenance of complete records, production and operating estimates and analyses, and planning and supervision of new equipment installations. Concentrate blending was a vital part of the operation. Manganese ores were the principal mill feed, but some fluorspar was also milled. Subsequently aided in design of 600 tpd gravity mill near Bouse, Arizona, including general layout and detail drawings of installations. Made survey for foundations, designed auxiliary equipment installations, and supervised construction. The company was liquidated after the cessation of government manganese purchases. It was the largest producer on the government car lot program.

7/58-2/60 Consulting Work

During this period made numerous mine examinations in Arizona, Nevada, Utah, New Mexico, and Colorado for Wells Cargo, Inc. Minerals involved were manganese, fluorspar, placer gold, iron, and perlite. Laboratory work was conducted on some of these minerals. Consulting work was done for various other parties during this period also. Most work was done before employment by Mohave Mining and Milling Co. but some followed cessation of their operations.

1/58-8/58 Dasco Mines, Corp.

General manager, Dasco Mines Corp., Wenden, Arizona. Management of 175 tpd open pit mine, flotation mill, and sintering plant for manganese. Estimates and analyses of all phases of operations, maintenance of complete operating records,

planning and supervision of new installations, mine examinations, supervision of company books and records, and labor relations. Operation was sold and then shut down.

7/57-12/57 Corona Mine and Consulting Work

Leasing small underground mercury mine, Napa County, Calif. Conducted underground rehabilitation and exploration. Consulting work involved investigation of various proposed mining and milling operations with estimates of stripping ratios, ore reserve calculations, economics, etc. For the Natomas Co., examined and evaluated open pit manganese mining and milling operations with 1,000 tpd HMS, jig, and table plant in Arizona. Estimated ore reserves, mining costs, and reported on possibilities of additional nearby deposits. Cut special samples for metallurgical tests deemed necessary. For the same company made preliminary examinations on several Arizona copper properties.

12/52-7/57 Teekay Mines, Inc.

Succeeding positions as junior engineer, mine superintendent, general superintendent, Teekay Mines, Inc. & Taylor Knapp Co., Calif. Division, Tracy, Calif. Underground and open pit mine, 100tpd magnetic-gravity mill producing battery grade manganese. Mine surveying and mapping, planning new underground openings and new open pit, supervision and regulation of ore extraction, production and economic estimates and analyses, maintenance of production records, design and supervision of new mill installations. Purchased mining and milling equipment. After cessation of mining and milling operations, operated metallurgical research laboratory, with emphasis on flotation of manganese, silver, zinc ores and on chemical production of potassium permanganate from manganese dioxide tailings.

7/52-11/52 Division of Highways

Junior engineer State of Calif. Division of Highways, Salinas, Calif. Surveying, testing, and inspecting on freeway construction. Quit to take mining job.

7/50-7/52 U.S. Navy

Involuntarily recalled to active duty as U.S. Naval Aviator. Carrier based fighter pilot.

9/49-7/50 Volo Mining Co.

Field engineer, Volo Mining Co., Placerville, Calif. In charge of new property examinations and open pit mining operations for 300 tpd flotation-cyanide mill. Maintained operating records, pit maps, planned pits, and conducted exploration and major sampling programs on several properties.

9/48-8/49 Leasing

Leased small underground antimony mine near Jacksonville, Oregon. Drove new underground workings and constructed small surface plant. Market failed.

6/48 Mackay School of Mines, University of Nevada, Reno, Nev. Graduated with B.S. in Mining Engineering.

ADDENDUM TO
PROFESSIONAL EXPERIENCE RECORD

HUGH C. INGLE, JR.

Since the end of the enclosed resumé (7/77), I have done a number of consulting jobs, although since 1979 my main effort has been to develop the Ashby, Mabel, and Garfield mines into an integrated mining and milling operation.

Work at the Ashby included sampling the dumps and setting up and operating a small heap leaching pad on those dumps, rehabilitating two mine shafts and adjacent underground workings, mapping the mine workings, surface trenching, cutting and assaying hundreds of underground and surface samples, running metallurgical tests, rehabilitating and operating a small (25 TPD) pilot flotation mill on underground ore and screened dump material.

Work at the Mabel/Garfield mines has included reopening numerous underground workings and exploring and partially mapping them, cutting and assaying numerous underground samples of rock in place and gob, extensively sampling the dumps and running metallurgical tests on composites. The collar of inclined Verneti Shaft has been replaced and the shaft rehabilitated (for exploration access) to the 300 Level of the vertical Mabel Shaft. (This level was rehabilitated to the Mabel Shaft pillar but was not completed because the promised operation of a custom mill failed to materialize. The level is now partly caved. The blocked out ore was not reached.) Ore has been selectively mined from the Mabel dump and shipped to Sunshine Mining Company's Sixteen-to-One mill at Silver Peak, Nevada. This mill has been shut down to custom ore processing since early 1987 and has not accepted custom ore on a regular basis since August of 1986, causing us to lose projected cash flow from the mines.

In the early 1990s we became convinced that there was no choice but to build our own mill. We decided to use flotation to avoid the environmental problems associated with cyanide. We obtained some financing and basically designed and built a 100 TPD portable crushing and screening plant and a portable gravity-flotation plant. We originally used the ball mill for grinding a flotation concentrate shipped to the Buckskin Mill of Sonora Mining Co. After two partial seasons we brought the grinding unit back to Ashby and set up to run custom ore. The complete mill was a long time abuilding because of serious illness of one of the partners. All the construction was built in house, mostly by my older son.

The consulting and contract work since 7/77 includes a six month rehabilitation, sampling, and long hole drilling project for McIntyre Mines; reopening a small vertical shaft for a group involving John Heizer, Frank McQuiston, Bob Shoemaker, etc.; sampling the Tuscarora mine dumps for McQuiston, Shoemaker, etc. with our pneumatic clam; sampling the Bodie dumps for NERCO with the clam; evaluating numerous small gold/silver mines for Richfield Resources; rehabilitating and sampling underground workings near Montgomery Pass for Cordex Exploration Co.; rehabilitating, sampling, and sealing off numerous shafts and underground workings for CoCa Mines at their Middle Buttes project near Mojave, California; rehabilitating for sampling and mapping a 1,000 foot vertical shaft near Gabbs, Nevada for CoCa Mines; testing hundreds of placer sam-

ADDENDUM TO
PROFESSIONAL EXPERIENCE RECORD

HUGH C. INGLE, JR.

ples for Cordex Exploration Co. at both their Rose Canyon and Valmy projects.

In addition to the above projects, my older son and I redesigned and built three portable mercury retorts for handling mercury bearing precipitates and cathodes, one for Alhambra Mines at Dayton, Nevada and two for Kappes, Cassidy, and Associates of Reno, Nevada. One of the latter went to Western Goldfields' Hog Ranch Mine north of Gerlach, Nevada and the other was shipped to a project in Peru. My older son and I later operated the retort at Hog Ranch and handled problems during refining for CoCa Mines following unexpected high levels of mercury in the precipitates from one of the pits at Middle Buttes. Security as practised by most gold mines had to be suspended and the integrity of my son and me totally relied upon. Accountability proved to be exceptional.

My older son has worked with me on these projects for over 20 years, except for two years active duty in the U.S. Navy. His college engineering training was interrupted after his sophomore year by military service, and he chose not to return. While in high school, and even before, he and his brother worked with me at our family owned mercury operation, including operating our rotary furnace and retort and doing underground mining.

Last year my son and I laid an access rail track to the bottom of a steep (as steep as 70%) narrow canyon. This year my son is reopening a 2,500 foot crosscut and retimbering it. It is a difficult job in an almost inaccessible place and is financed by the owner for environmental reasons.

SECOND ADDENDUM TO
PROFESSIONAL EXPERIENCE RECORD

HUGH C. INGLE, JR.

During 1989 worked out a crash program to handle mercury laden precipitates unexpectedly encountered by Cactus Gold Mines (operated by CoCa Mines) at Mojave, California. Used retort we built earlier at Hog Ranch Mine to lower Hg content (much of it to less than 50 ppm) from as high as 37% to make melting possible without a mercury hazard. Oversaw Doré production and prepared it for shipment to refiner. Maintained production to cover all operating costs until a retort was built and installed at Mojave.

In 1990 cut metallurgical samples of copper ore amounting to 6 to 8 tons and shipped for a former vice president of CoCa Mines.

Continued development of Mabel/Garfield and Ashby mines and redesigned and rebuilt a portable crushing plant on our own account.

In addition, we sank a decline of over 100 feet in difficult ground, maintaining exact angle and heading. We cut assay, metallurgical, and specific gravity samples during and after completing the shaft for CoCa Mines at their Calvada Project near Gabbs, Nevada.

HUGH C. INGLE, JR.
MINING ENGINEER
REGISTERED, CALIFORNIA
1181 NWY. 326, YERINGTON, NEVADA 89447
AREA CODE 702-463-2893

October 13, 1999

Mrs. Eleanor Swent, Interviewer/Editor
University of California, Berkeley
Regional Oral History Office
The Bancroft Library
Berkeley, California 94720-6000

Dear Lee:

I am sorry this proof reading has taken so long. As you may have realized, my arm has made even my hunt-and-peck typing even slower and on top of that, I have been buried in paper work. Thank you for a seemingly inexhaustable patience.

You asked for some additional information on the 3809 regulations. These are new proposed Federal Regulations put out by Secretary of the Interior Bruce Babbitt because he's tired of waiting for the U.S. Congress to act legislatively, so he has taken it upon himself to write new rules more in keeping with his own ideas of what the country needs. The proposal is 43 CFR-3809, Surface Management Regulations for Locatable Mineral Operations brings us closer to micro-management of another industry by the Federal government. Too many decisions are left up to the whims of bureaucrats. There are many onerous new or revised regulations which will make it more difficult or impossible for the small operator to survive -- from greater delays on permits to greater costs for reclamation bonding to greater costs for reclamation its self to greater costs for preparing Plans of Operations vs Notices, etc., ad infinitum. Some of these extra costs were mentioned in my interview beginning on page 229. I expect to attend a briefing on the report of The National Research Council, Committee on Hardrock Mining on Federal Lands. Congress requested this report under the auspices of the National Academy of Sciences to question whether new rules and regulations were needed or whether the old rules and regulations were doing a good job. The investigation cost \$900,000. I testified before the Hardrock Committee on April 22. Babbitt has to wait 120 days from September 19, 1999 before he can institute the new rules and during that period he must accept new comments from the public.

I don't know whether I sent you a copy of my experience resume. At any rate, herewith is an updated one. The only changes are corrections and additions on the top two pages; these should bring it up to date.

If you have any further questions, please don't hesitate to call me. I appreciate your kind words about the interview.

Had a cancer checkup last week; all clear. Good for another six months.

Yours very truly,

Hugh C. Ingle, Jr.
Hugh C. Ingle, Jr.

From California Journal of Mines
and Geology, October 1939, vol.
35, #4.

408

REPORT OF STATE MINERALOGIST

CALISTOGA HOT SPRINGS

(See under OTHER COUNTIES AND MINES. page 476.)

CORONA MINE

Location. M. D. M. T. 10 N., R. 6 W., Secs. 32 and 33, about 9 miles southeast of Middletown, adjoining the Oat Hill mine which lies to the east.

Ownership. Vallejo Quicksilver Mining Company. James McCauley, of Vallejo, president.

Production History. 1895-1906, 1916.

The Corona mine is probably the latest discovered mine of any size in the Mayacmas district. Production began in 1895 and ended in 1904. During this period it was operated by the present owners, and considerable difficulty was encountered in treatment problems. A large amount of pyrite closely associated with the cinnabar made condensation of the mercury vapors difficult. A 50-ton Scott furnace was used for reduction of the ore, and this furnace is still standing on the property.

A small production was realized in 1916, by retorting ore taken out during a prospecting program; but since that time, the mine has been idle. The total recorded production to date is 4626 flasks.

General Geology. The Corona mine lies on the contact of serpentine and the same sandstone encountered at the Oat Hill mine. The ore occurs in a black chert between walls of serpentine and sandstone. Pyrite is an abundant and closely associated mineral with cinnabar in this deposit.

Bibliography: State Mineralogist Reports XIII. p. 579; XIV. p. 286; XXV, p. 229. Bulletins 27, p. 79; 78, p. 81.

MERCURY

Lake County

The Abbott mine is typical of those mercury properties which were discovered in the early days, but which can still make an important contribution to the economy of the state and to our needed domestic production when subject to an intelligent and well-planned exploration program. Mining was done both on the surface and underground.

The Great Western mine, southwest of Middletown, was operated by Geodata Systems. The company reopened the No. 2 adit which bears southwesterly and provides the entrance to the newer workings of the mine. The adit was open about 250 feet where it passed from brecciated sandstone into strongly sheared serpentine and continued for another 150 feet to a fault zone. Here, the course of the adit changes to a northwesterly direction as it explored the contact between sheared serpentine on the southwest, and brecciated sandstone and shale on the northeast. A small stope about 300 feet northwest of the turn explored a body of silica carbonate containing stringers of cinnabar. The "roll" structure of the contact was exhibited at this point as the contact flattened and then dipped steeply to the northeast. An open pit was developed on the surface, about 150 feet above the No. 2 adit.

The Wall Street mine on Dry Creek southwest of Middletown was operated by Kinyon and Austin. Most of the underground workings are in silica-carbonate rock which crops out on the surface as a westerly-dipping ledge. During 1970, surface work on the west part of the claim was confined to a second outcrop of silica-carbonate rock which may be a faulted segment of the eastern ledge. The western outcrop is permeated with thin vertical stringers of quartz. The latter appear to have been deposited after the cinnabar and native mercury which constitute the ore minerals. The ore was hauled to a retort near Middletown for treatment and recovery of the mercury.

Napa County

The Corona mine is operated by Hugh Ingle, Jr., Middletown. The rocks in this area are chiefly sandstone

and shale of the Franciscan Formation which have been folded, faulted, and intruded by irregular shaped bodies of serpentine. Remnant lava flows and bedded volcanic ash of Pliocene age overlie the older rocks. Serpentine in the Corona mine area is locally altered to a dark, brittle, opalitic silica carbonate which carries cinnabar as veins, veinlets, and coatings on fracture planes, and makes good furnace ore. The pyrite content of this ore is relatively high. The ore was mined underground in open stopes and treated at the surface in a rotary furnace with rated capacity of 20 tons per day.

The Oat Hill mine, northeast of the Corona, is operated by William Kritikos, Pleasanton. This mine is developed in altered sandstone and shale on the southwest slopes of Table Mountain. Here, cinnabar occurs as fillings along faults, nearby bedding planes, and in addition is disseminated over a wide area making low-grade ore. The ore was mined in an open pit at the maximum rate of 100 tons per day. The concentrating plant, formerly located below the mine, was moved to a new location on a knoll near the head of Cassidy Creek where a broader area is available for the plant layout, including settling and clarification ponds, and fine table tailings. The mine ore was crushed and washed to separate the cinnabar, and a final concentrate was made using four gravity tables. Wash water was provided by springs on the property and after clarification it was recirculated and reused. The cinnabar concentrate was retorted and liquid mercury was recovered.



View of the new rotary furnace plant at the Manhattan mercury mine in Napa County. This plant was installed by the One Shot Mining Company. Low-grade material from the tailings pile in the background, plus ore from new pits constitute the feed to the plant. *Photo by Fenelon F. Davis.*

The Manhattan mine is in the northwest corner of the county about 20 miles southeast of Lower Lake. During the summer of 1968, the One Shot Mining Company installed a new rotary furnace and began to treat the extensive piles of mine tailings which had accumulated from previous operations. The tailings consist chiefly of silicified or hydrothermally altered volcanic tuff, termed opalite by the miners, along with some unaltered tuff and altered basalt. Originally, the cinnabar occurred as veinlets filling joint cracks, along bedding planes, and as local disseminations in

the Tertiary volcanic rock series which overlies the fault-contact between the serpentine on the west and the Jurassic rocks on the east. Mining continued through 1970.

APPENDIX B

WESTERN MINING IN THE TWENTIETH CENTURY ORAL HISTORY SERIES

PREFACE

The oral history series on Western Mining in the Twentieth Century documents the lives of leaders in mining, metallurgy, geology, education in the earth and materials sciences, mining law, and the pertinent government bodies. The field includes metal, non-metal, and industrial minerals. In its tenth year the series numbers thirty-five volumes completed and others in process.

Mining has changed greatly in this century: in the technology and technical education; in the organization of corporations; in the perception of the national strategic importance of minerals; in the labor movement; and in consideration of health and environmental effects of mining.

The idea of an oral history series to document these developments in twentieth century mining had been on the drawing board of the Regional Oral History Office for more than twenty years. The project finally got underway on January 25, 1986, when Mrs. Willa Baum, Mr. and Mrs. Philip Bradley, Professor and Mrs. Douglas Fuerstenau, Mr. and Mrs. Clifford Heimbucher, Mrs. Donald McLaughlin, and Mr. and Mrs. Langan Swent met at the Swent home to plan the project, and Professor Fuerstenau agreed to serve as Principal Investigator.

An advisory committee was selected which included representatives from the materials science and mineral engineering faculty and a professor of history of science at the University of California at Berkeley; a professor emeritus of history from the California Institute of Technology; and executives of mining companies. Langan Swent delighted in referring to himself as "technical advisor" to the series. He abetted the project from the beginning, directly with his wise counsel and store of information, and indirectly by his patience as the oral histories took more and more of his wife's time and attention. He completed the review of his own oral history transcript when he was in the hospital just before his death in 1992. As some of the original advisors have died, others have been added to help in selecting interviewees, suggesting research topics, and securing funds.

The project was presented to the San Francisco section of the American Institute of Mining, Metallurgical, and Petroleum Engineers (AIME) on "Old-timers Night," March 10, 1986, when Philip Read Bradley, Jr., was the speaker. This section and the Southern California section of AIME provided initial funding and organizational sponsorship.

The Northern and Southern California sections of the Woman's Auxiliary to the AIME (WAAIME), the California Mining Association, and the Mining and Metallurgical Society of America (MMSA) were early supporters. Later the National Mining Association became a sponsor. The

project was significantly advanced by a generous bequest received in November 1997 upon the death of J. Ward Downey, UC Berkeley alumnus and early member of the mining series advisory committee. His own oral history was completed in 1992. Other individual and corporate donors are listed in the volumes. Sponsors to date include nineteen corporations, four foundations, and 113 individuals. The project is ongoing, and funds continue to be sought.

The first five interviewees were all born in 1904 or earlier. Horace Albright, mining lawyer and president of United States Potash Company, was ninety-six years old when interviewed. Although brief, this interview adds another dimension to a man known primarily as a conservationist.

James Boyd was director of the industry division of the military government of Germany after World War II, director of the U.S. Bureau of Mines, dean of the Colorado School of Mines, vice president of Kennecott Copper Corporation, president of Copper Range, and executive director of the National Commission on Materials Policy. He had reviewed the transcript of his lengthy oral history just before his death in November, 1987. In 1990, he was inducted into the National Mining Hall of Fame, Leadville, Colorado.

Philip Bradley, Jr., mining engineer, was a member of the California Mining Board for thirty-two years, most of them as chairman. He also founded the parent organization of the California Mining Association, as well as the Western Governors Mining Advisory Council. His uncle, Frederick Worthen Bradley, who figures in the oral history, was in the first group inducted into the National Mining Hall of Fame in 1988.

Frank McQuiston, metallurgist for the Raw Materials Division of the Atomic Energy Commission and vice president of Newmont Mining Corporation, died before his oral history was complete; thirteen hours of taped interviews with him were supplemented by three hours with his friend and associate, Robert Shoemaker.

Gordon Oakeshott, geologist, was president of the National Association of Geology Teachers and chief of the California Division of Mines and Geology.

These oral histories establish the framework for the series; subsequent oral histories amplify the basic themes. After over thirty individual biographical oral histories were completed, a community oral history was undertaken, documenting the development of the McLaughlin gold mine in the Napa, Yolo, and Lake Counties of California (the historic Knoxville mercury mining district), and the resulting changes in the surrounding communities. This comprises forty-three interviews.

Future researchers will turn to these oral histories to learn how decisions were made which led to changes in mining engineering education, corporate structures, and technology, as well as public policy regarding minerals. In addition, the interviews stimulate the deposit, by interviewees and others, of a number of documents, photographs, memoirs, and other materials related to twentieth century mining in the West. This collection is being added to The Bancroft Library's extensive holdings. A list of completed and in process interviews for the mining series appears at the end of this volume.

The Regional Oral History Office is under the direction of Willa Baum, division head, and under the administrative direction of The Bancroft Library.

Interviews were conducted by Malca Chall and Eleanor Swent.

Willa K. Baum, Division Head
Regional Oral History Office

Eleanor Swent, Project Director
Western Mining in the Twentieth
Century Series

January 1998
Regional Oral History Office
University of California, Berkeley

The Regional Oral History Office
would like to express its thanks to the organizations
and individuals whose encouragement and support have made possible
The Western Mining in the Twentieth Century Series.

DONORS TO
THE WESTERN MINING IN THE TWENTIETH CENTURY
ORAL HISTORY SERIES
1986-1999

Organizations

American Institute of Mining, Metallurgical, and Petroleum Engineers,
San Francisco, Southern California, and Black Hills Sections
Woman's Auxiliary to the AIME, Southern California and Northern California
Bechtel Foundation
California Mining Association
The Cleveland-Cliffs Foundation
The Jackling Fund of the Mining and Metallurgical Society of America
National Mining Association
South Dakota School of Mines and Technology

Corporations

ASARCO
Bechtel Group Incorporated
BHP Minerals
Chemical Lime Company
The Clarkson Company
Cleveland-Cliffs, Inc.
Cyprus Amax Minerals Company
Dow Chemical Company
EIMCO Process Equipment Company
E. M. Warburg, Pincus & Co., Inc.
Freeport-McMoRan
Hazen Research, Inc.
Hecla Mining Company
Homestake Mining Company
Kennecott Corporation
Krebs Engineers
Magma Copper Company
Newmont Mining Corporation
Pacific Gas & Electric Company
Phelps Dodge Corporation
United States Borax & Chemical Corporation
Wharf Resources, Limited

The J. Ward Downey Bequest Fund

Patrons

Frank F. Aplan
 Charles and Lois Barber
 Bechtel Foundation
 James Boyd
 Arthur C. Bradley
 Catherine C. Campbell
 Curtis Clarkson
 J. Robert and Edna M. Clarkson
 Norman Cleaveland
 Rosemary and Harry M. Conger
 Barbara H. and James T. Curry, Jr.
 Donald Dickey
 Wayne Dowdey
 J. Ward and Alberta P. Downey
 Mr. & Mrs. Warren Fenzi
 Douglas and Margaret Fuerstenau
 Launce E. Gamble
 James M. Gerstley
 Robert M. Haldeman
 The Hearst Foundation, Inc.
 Mrs. Paul C. Henshaw, in memory of
 her husband, Paul C. Henshaw
 William A. Humphrey

James H. Jensen
 Arthur I. Johnson
 G. Frank Joklik
 Arthur H. Kinneberg
 Mrs. Lois B. Lippincott
 John S. Livermore
 J. David Lowell
 Dean A. McGee
 Mrs. Frank W. McQuiston, Jr., in
 memory of Frank W. McQuiston, Jr.
 George B. Munroe
 Gordon B. Oakeshott
 Thomas and Margaret O'Neil
 Vincent D. Perry
 Plato Malozemoff Foundation
 Public Resource Foundation
 Carl L. Randolph
 Joseph Rosenblatt
 Berne Schepman
 Mr. and Mrs. Richard J. Stoeher
 Langan and Eleanor Swent
 Milton Ward
 Mr. and Mrs. Alexander M. Wilson

Individuals

Claude J. Artero
 Rebecca Bender
 Bruce A. Bolt
 Clemence DeGraw Jandrey Boyd
 James Brown Boyd, Harry Bruce Boyd,
 Douglas Cane Boyd, and Hudson
 Boyd in memory of James Boyd
 Philip and Katherine Bradley
 Albert T. Chandler
 David J. Christie
 William B. Clark
 Mr. David Crouch
 Nancy S. and James T. Curry, Sr.
 Stanley Dempsey
 Edward C. Dowling
 Elisabeth L. Egenhoff
 Christine Finney
 H. S. Pete Fowler
 Maurice and Joyce Fuerstenau
 Louis R. Goldsmith
 Donald L. Gustafson
 Jayne K. Haldane
 Kenneth N. Han
 Guy H. Harris
 Bonnie, Russell, and Steve Harford
 James H. Hickey
 Mason L. and Marie J. Hill
 Gael Hodgkins

Sylvia Hochscheid, in memory of
 Robert E. Hochscheid
 Mrs. Bruce S. Howard, in memory of
 Henry Harland Bradley
 Lewis L. Huelsdonk
 Ruth B. Hume
 Howard Janin
 Jack M. Jones
 Alfred Juhl
 Evan Just
 Sheila Kelley
 James C. Kimble
 Kenneth Kinghorn
 Noel W. Kirshenbaum
 Nancy H. Landwehr
 Carl F. Love
 Plato Malozemoff
 Sylvia C. McLaughlin
 Sylvia C. McLaughlin, in memory of
 Jay Kimpston Swent
 Frances B. Messinger
 L. Arthur Norman, Jr.
 Patrick O'Neill
 K. Osseo-Asare
 George F. Reed
 John J. Reed
 Richard W. Rees
 Jane A. Rummel

Simon D. Strauss
 John R. Struthers
 Virginia Bradley Sutherland, in
 memory of Helen R. Henshaw
 Jack Thompson
 James V. Thompson
 Twyla J. Thompson

John J. Trelawney
 William I. Watson
 Barbara A. Whitton in memory of
 William B. Whitton
 William B. Whitton
 Sheldon Wimpfen
 Judy D. Woodward

In Memory of Catherine C. Campbell

Mr. and Mrs. E. W. Averill, Jr.
 Fenelon F. Davis

Richard Friedlander
 Richard M. Stewart

In Memory of Langan W. Swent

Marjorie D. Bjorlo
 Christine W. S. Byrd
 John and Dagmar Dern
 Sylvia C. McLaughlin

Eleanor H. Swent
 Jeannette F. Swent
 Richard L. Swent
 Regional Oral History Office Staff

In Memory of William B. Clark

Fenelon Davis
 Lowell Dygert
 Mary G. Freedman
 Marilyn Glover
 Virginia Goldsmith
 Barbara Henderson

John Matschek
 Hilda Schramm
 George Shutes
 Barbara Vollmer
 Mary Witt
 Mary Woods

In Memory of J. Ward Downey

Willa Baum
 Douglas Fuerstenau

James Jensen
 Eleanor H. Swent

In Memory of Phillip R. Bradley, Jr.

Mr. and Mrs. John P. Austin
 Gail and Heath Angelo, Jr.
 Earl Beistline
 The Claremont Book Club
 Judge and Mrs. John S. Cooper
 Professor Emeritus Gregory Grossman
 Marily and Thomas Johnson

Remington and Jean Low
 Sylvia C. McLaughlin
 Rubye C. Reade
 Mr. and Mrs. Thomas B. Shaw
 Judge and Mrs. John Sparrow
 Eleanor H. Swent
 Dr. and Mrs. Edward E. Waller, Jr.

Western Mining in the Twentieth Century Oral History Series

Interviews Completed, March 2000

- Horace Albright, *Mining Lawyer and Executive, U.S. Potash Company, U.S. Borax, 1933-1962, 1989*
- Samuel S. Arentz, Jr., *Mining Engineer, Consultant, and Entrepreneur in Nevada and Utah, 1934-1992, 1993*
- James Boyd, *Minerals and Critical Materials Management: Military and Government Administrator and Mining Executive, 1941-1987, 1988*
- Philip Read Bradley, Jr., *A Mining Engineer in Alaska, Canada, the Western United States, Latin America, and Southeast Asia, 1988*
- Catherine C. Campbell, Ian and Catherine Campbell, *Geologists: Teaching, Government Service, Editing, 1989*
- William Clark, *Reporting on California's Gold Mines for the State Division of Mines and Geology, 1951-1979, 1993*
- John Robert Clarkson, *Building the Clarkson Company, Making Reagent Feeders and Valves for the Mineral Industry, 1935 to 1998, 1999*
- Norman Cleaveland, *Dredge Mining for Gold, Malaysian Tin, Diamonds, 1921-1966; Exposing the 1883 Murder of William Raymond Morley, 1995*
- James T. Curry, Sr., *Metallurgist for Empire Star Mine and Newmont Exploration, 1932-1955; Plant Manager for Calaveras Cement Company, 1956-1975, 1990*
- Donald Dickey, *The Oriental Mine, 1938-1991, 1996*
- J. Ward Downey, *Mining and Construction Engineer, Industrial Management Consultant, 1936 to the 1990s, 1992*
- Warren Fenzi, *Junior Engineer to President, Director of Phelps Dodge, 1937 to 1984, 1996*
- Hedley S. "Pete" Fowler, *Mining Engineer in the Americas, India, and Africa, 1933-1983, 1992*

- James Mack Gerstley, *Executive, U.S. Borax & Chemical Corporation; Trustee, Pomona College; Civic Leader, San Francisco Asian Art Museum*, 1991
- Robert M. Haldeman, *Managing Copper Mines in Chile: Braden, CODELCO, Minerec, Pudahuel; Developing Controlled Bacterial Leaching of Copper from Sulfide Ores; 1941-1993*, 1995
- John F. Havard, *Mining Engineer and Executive, 1935-1981*, 1992
- Wayne Hazen, *Plutonium Technology Applied to Mineral Processing; Solvent Extraction; Building Hazen Research; 1940-1993*, 1995
- George Heikes, *Mining Geologist on Four Continents, 1924-1974*, 1992
- Helen R. Henshaw, *Recollections of Life with Paul Henshaw: Latin America, Homestake Mining Company*, 1988
- Homestake Mine Workers, Lead, South Dakota, 1929-1993*, interviews with Clarence Kravig, Wayne Harford, and Kenneth Kinghorn, 1995
- Lewis L. Huelndonk, *Manager of Gold and Chrome Mines, Spokesman for Gold Mining, 1935-1974*, 1988
- William Humphrey, *Mining Operations and Engineering Executive for Anaconda, Newmont, Homestake, 1950 to 1995*, 1996
- Hugh C. Ingle, Jr., *Independent Small Mines Operator, 1948 to 1999; Corona Mine, 2000*
- James Jensen, *Chemical and Metallurgical Process Engineer: Making Deuterium, Extracting Salines and Base and Heavy Metals, 1938-1990s*, 1993
- Arthur I. Johnson, *Mining and Metallurgical Engineer in the Black Hills: Pegmatites and Rare Minerals, 1922 to the 1990s*, 1990
- G. Frank Joklik, *Exploration Geologist, Developer of Mt. Newman, President and CEO of Kennecott, 1949-1996; Chairman, Salt Lake 2002 Olympic Winter Games Committee, 1997*
- Evan Just, *Geologist: Engineering and Mining Journal, Marshall Plan, Cyprus Mines Corporation, and Stanford University, 1922-1980*, 1989
- Robert Kendall, *Mining Borax, Shaft-Freezing in Potash Mines, U.S. Borax, Inc., 1954-1988*, 1994
- The Knoxville Mining District, The McLaughlin Gold Mine, Northern California, Volume I*, 1998
- Anderson, James, "Homestake Vice President-Exploration"
- Baker, Will, "Citizen Activist, Yolo County"
- Birdsey, Norman, "Metallurgical Technician, McLaughlin Process Plant"
- Bledsoe, Brice, "Director, Solano Irrigation District"

The Knoxville Mining District, The McLaughlin Gold Mine, Northern California, Volume II, 1998

- Cerar, Anthony, "Mercury Miner, 1935-1995"
- Ceteras, John, "Organic Farmer, Yolo County"
- Conger, Harry, "President, Chairman, and CEO, Homestake Mining Company, 1977 to 1994"
- Corley, John Jay, "Chairman, Napa County Planning Commission, 1981 to 1985"
- Cornelison, William, "Superintendent of Schools, Lake County" (Includes an interview with John A. Drummond, Lake County Schools Attorney)

The Knoxville Mining District, The McLaughlin Gold Mine, Northern California, Volume III, 1998

- Crouch, David, "Homestake Corporate Manager-Environmental Affairs"
- Enderlin, Elmer, "Miner in Fifty-Eight Mines"
- Fuller, Claire, "Fuller's Superette Market, Lower Lake"
- Goldstein, Dennis, "Homestake Corporate Lawyer"
- Guinivere, Rex, "Homestake Vice President-Engineering"

The Knoxville Mining District, The McLaughlin Gold Mine, Northern California, Volume IV, 1998

- Gustafson, Donald, "Homestake Exploration Geologist, 1975-1990"
- Hanchett, Bonny Jean, "Owner and Editor, Clearlake Observer, 1955-1986"
- Hickey, James, "Director of Conservation, Development, and Planning for Napa County, 1970 to 1990"
- Jago, Irene, "The Jagos of Jago Bay, Clear Lake"
- Jonas, James, "Lake County Fuel Distributor"
- Koontz, Dolora, "Environmental Engineer, McLaughlin Mine, 1988-1995"

The Knoxville Mining District, The McLaughlin Gold Mine, Northern California, Volume V, 1998

- Kritikos, William, "Operator, Oat Hill Mine"
- Landman, John, "Rancher, Morgan Valley"
- Lyons, Roberta, "Journalist and Environmentalist"
- Madsen, Roger, "Homestake Mechanical Engineer"
- Magoon, Beverly, "Merchant and Craft Instructor, Lower Lake"
- McGinnis, Edward, "Worker at the Reed Mine"

The Knoxville Mining District, The McLaughlin Gold Mine, Northern California, Volume VI, 1999

- Robert McKenzie, "McKenzies in Monticello, Berryessa Valley"
- Harold Moskowitz, "Napa County Supervisor"
- Marion Onstad, "Neighbor and Employee of the McLaughlin Mine, 1980-1995"
- Ronald Parker, "Resident Manager of the McLaughlin Mine, 1988-1994"
- Richard Stoehr, "Homestake Engineer and Geologist to Senior Vice-President and Director"
- Joseph Strapko, "Exploration Geologist, McLaughlin Mine Discovery, 1978"

Marian Lane, *Mine Doctor's Wife in Mexico During the 1920s*, 1996

- J. David Lowell, *Using Applied Geology to Discover Large Copper and Gold Mines in Arizona, Chile, and Peru*, 1999
- Plato Malozemoff, *A Life in Mining: Siberia to Chairman of Newmont Mining Corporation, 1909-1985*, 1990
- James and Malcolm McPherson, *Brothers in Mining*, 1992
- Frank Woods McQuiston, Jr., *Metallurgist for Newmont Mining Corporation and U.S. Atomic Energy Commission, 1934-1982*, 1989
- Gordon B. Oakeshott, *The California Division of Mines and Geology, 1948-1974*, 1988
- James H. Orr, *An Entrepreneur in Mining in North and South America, 1930s to 1990s*, 1995
- Vincent D. Perry, *A Half Century as Mining and Exploration Geologist with the Anaconda Company*, 1991
- Patrick Purtell, *Maintenance and Management at the McLaughlin Mine, 1985 to 1997*, 1999
- Carl Randolph, *Research Manager to President, U.S. Borax & Chemical Corporation, 1957-1986*, 1992
- John Reed, *Pioneer in Applied Rock Mechanics, Braden Mine, Chile, 1944-1950; St. Joseph Lead Company, 1955-1960; Colorado School of Mines, 1960-1972*, 1993
- Joseph Rosenblatt, *EIMCO, Pioneer in Underground Mining Machinery and Process Equipment, 1926-1963*, 1992
- Eugene David Smith, *Working on the Twenty-Mule Team: Laborer to Vice President, U.S. Borax & Chemical Corporation, 1941-1989*, 1993
- Simon Strauss, *Market Analyst for Non-ferrous Metals and Non-metallic Minerals, Journalist, Mining Corporation Executive, 1927-1994*, 1995
- Langan W. Swent, *Working for Safety and Health in Underground Mines: San Luis and Homestake Mining Companies, 1946-1988*, 1995
- James V. Thompson, *Mining and Metallurgical Engineer: the Philippine Islands; Dorr, Humphreys, Kaiser Engineers Companies; 1940-1990s*, 1992
- William Wilder, *Owner of One Shot Mining Company: Manhattan Mercury Mine, 1965-1981*, 1996

Interviews In Process

Frank Aplan, metallurgist
Harry M. Conger, Kaiser, Homestake
Raymond Krauss, "Environmental Manager, McLaughlin Mine"
John Livermore, geologist
Peter Scribner, "Knoxville Mine, 1941-1944"
Robert Shoemaker, metallurgist
Jack Thompson, "General Manager, McLaughlin Mine, 1981-1988"
Twyla Thompson, "County Supervisor, Yolo County"
Avery Tindell, "Capay Valley Environmentalist"
John Turney, "McLaughlin Metallurgist: Pioneering Autoclaving for Gold"
Della Underwood, "Knoxville Rancher, McLaughlin Mine Surveyor"
Walter Wilcox, "County Supervisor, Lake County"
Alexander Wilson, BHP-Utah Minerals

ADVISORS TO THE SERIES, WESTERN MINING IN THE TWENTIETH CENTURY

Professor Douglas Fuerstenau, Principal Investigator
 Plato Malozemoff Professor Emeritus, Department of Materials Science and
 Mineral Engineering, University of California, Berkeley

Robert R. Beebe, Senior Vice
 President (retired), Homestake
 Mining Company

Dr. Robert Bartlett
 Dean Emeritus, College of Mines,
 University of Idaho

Michael Bickers
 President and CEO (retired), Mining
 and Metals Group, Davy-McKee

Mrs. Philip R. Bradley
 Honorary Life Member, Woman's
 Auxiliary, American Institute of
 Mining, Metallurgical, and Petroleum
 Engineers

Professor George Brimhall
 Director, Earth Resources Center
 Department of Geology and Geophysics
 University of California, Berkeley

Henry Colen, President, San
 Francisco Mining Associates

Professor Richard Goodman, Emeritus,
 Department of Civil Engineering,
 University of California, Berkeley

Professor Roger Hahn, Department of
 History, University of California,
 Berkeley

Joseph Hanzel, Facilities Safety
 Manager, NASA-Ames Research Center

Clifford Heimbucher, C.P.A.,
 Consultant, Varian Associates, Inc.

William Humphrey, President and CEO,
 Vice Chairman (retired), Homestake
 Mining Co.

Noel Kirshenbaum, Manager, Mineral
 Products Development, Placer Dome
 U.S.

Joseph P. Matoney, Vice President
 (retired) Coal, Kaiser Engineers,
 Inc.

Mrs. Donald H. McLaughlin, Founder,
 Save San Francisco Bay Association

Professor Malcolm McPherson, Massey
 Professor of Mining Engineering,
 Virginia Polytechnic Institute and
 State University

Professor H. Frank Morrison,
 Department of Materials Science and
 Mineral Engineering, University of
 California, Berkeley

Professor Joseph A. Pask, Department
 of Materials Science and Mineral
 Engineering, University of
 California, Berkeley

 * Advisors deceased during the
 period of the project:

*Philip R. Bradley, Former Chairman,
 California State Mining and Geology
 Board

*Professor Neville G. Cook,
 Department of Materials Science and
 Mineral Engineering, University of
 California, Berkeley

*J. Ward Downey, Engineering and
 Industrial Management Consultant

*John Havard, Senior Vice President
 (retired), Kaiser Engineers, Inc.

*Plato Malozemoff, Chairman
 Emeritus, Newmont Mining Corporation

*Professor Emeritus Charles Meyer,
 Department of Geology, University of
 California, Berkeley

*Professor Emeritus Rodman Paul,
 Department of History, California
 Institute of Technology

*Langan W. Swent, Vice President
 (retired), Homestake Mining Company

INDEX--Hugh Ingle

- Abbott Mine, CA, 122, 124-125
 air quality concerns, 122-125, 130, 138, 147, 149
 Altoona Mine, CA, 89-90
 American Institute of Mining Engineers [AIME], 59, 67
 Anacaonda Co., 2, 132, 133
 antimony mining, 54, 57-60
 Arco, 111
 Ashby Mine, NV, 138, 140
 assays, 86-87; copper, 63, 133; gold, 63, 108; manganese, 69-70, 93, 95; mercury, 10-12, 64, 82, 105
 Atlas-Copco compressor, 79
 Atlas-Copco jack drill, 6-7, 83
- Blackwell, -----, 14
 Bradley, Philip, 12, 122; family, 86, 91
 Brazil, mining tantalum in, 98-103
 Bureau of Land Management [BLM], 28, 62, 145, 152
- Cactus Queen Mine, CA, 86-87
 California Bureau of Mines, 1-2
 California Highway Department, 66
 Camelari, Andy, 104
 Carpenter, Jay, 152
 Cerar, Anthony, 18-19
 childhood, 36-47
 Chuquicamata, Chile, 2
 cinnabar, 14, 22, 90-92, 104-105.
 See also mercury mining
 coal mines, 110-112; in Japan, 65-66
 compressor, 6, 59, 79
 condenser, 13-17, 25-26, 30-33, 79, 82, 85
 consulting work, 3, 25, 77, 79, 83-109, 135-136
- copper mines, 63-64, 77, 88, 132-134
 Corona Mine, CA, 1-36, 73, 75-83, 85, 86, 88, 92, 121, 123, 130, 146
 Cottrell furnace, 4-5, 10-14, 22, 27-30, 33, 77-79, 82
 Coulterville Mine, CA, 129-131
 crusher, 27-28, 91
 cyanide, 61, 143
- Dasco Mines, 92-95
 Defense Minerals Exploration Program [DMEA], 76
 Depression, the Great, 36, 151
 drilling, 59, 104, 135; air track, 104. See also Atlas-Copco jack drill
- Ely, NV copper mines, 5, 77
 Emerson, Don, 76
 Environmental Protection Administration [EPA], 28, 104, 138, 149, 151
 environmental concerns and mining waste disposal, 104, 138, 147, 149-152
 exploration, minerals, 7, 84-85
- FMC Coal Mines, 110-111
 Frederick, Francis, 4, 11, 86, 87, 90, 103, 104-105, 129-130
 Fruit Growers Supply, 104-105
- G.I. Bill (Serviceman's Readjustment Act of 1944), 55
 Garfield Mine, NV, 138, 140, 145-146
 Gargiulio, Tony, 21-24, 123

geology, profession of, 2-3, 5, 77, 84-87, 131, 152
 Gianella, Dr.--, 152
 gold mining and processing, 37-46, 61-63, 87-89, 135-136, 147-148
 Gold Hill Mine, OR, 37
 government contracts, 70, 73, 82, 92-94, 110-111
 Great Western Mine, 90, 92
 Guadalupe Mine, CA, 103-104, 124

Hammond, Claude, 152-153
 hard hats, 125
 Hauck burner, 29
 health issues, amoebic dysentery, 102-103; cancer, 138-139; syphilis, 122
 Heiser, John, 57, 59
 Helen Mine, CA, 84-85, 123
 hoeing machine, 23-24, 33, 79, 82

Independence Mine, NV, 88-89
 Ingle daughters, 25, 54, 60
 Ingle, Dick (son), 24-25, 78, 112-114, 130, 144, 148
 Ingle father-in-law, 22, 51
 Ingle, Hugh, Sr. (father), 4, 36-40, 44, 46-47, 55, 58, 60
 Ingle, Hughie (son), 21, 24-25, 34-35, 78, 81-82, 86-87, 104, 114-119, 121, 130-131, 133-134, 136, 139, 143-144, 146, 148-149
 Ingle, Janet (wife), 10, 22-25, 37, 50-51, 54-55, 60, 64-65, 79, 82, 112-114, 127, 139, 148
 Ingle, Junie (daughter), 56, 60, 149
 Ingle, mother, 36, 37, 46-47

Jackpile Mine, 132
 Johnston, Andy, 19-21, 28-31, 33
 Jones, Henry "Hank," 58-60

Knaebel, Charles P. "Chid," 3, 132
 Knaebel, Jack, 132-134
 Knapp, Sanford, 3
 Korean conflict, 52-56, 63, 64, 66, 116, 125-129
 Kritikos, Kurt, 32
 Kritikos, William, 3-4, 6-7, 24, 129-132

labor relations, 73
 Ladd Mine, CA, 87
 leaching, 132-134
 Leadville Mine, NV, 130-131
 LeDoux & Company, 70, 94, 95
 Livermore, John, 2, 16, 17-18, 75-76, 143, 145-146
 Lueshi Mine, Congo, 96

Mabel Mine, NV, 131, 138, 145, 147
 Mace sintering plant, 92-93
 Mackay, John, 62, 64
 manganese mining and processing, 67-74, 87-88, 92-95; battery-grade, 2-3, 68-70; metallurgical grade, 3
 mapping, 86-87, 90, 104, 141-142, 147-148
 marcasite, 12, 16, 124
 McCauley family, the, 2
 mercury mining and processing, 1-35, 75-85, 89-90, 95, 103-109, 122-123, 124
 metallurgical problems, in manganese mining, 68-70; in mercury mining, 1-2, 7-9, 75, 79, 82
 methane gas, in mercury mines, 122
 military service, U.S. Navy, 48-56, 65, 114, 143; Naval Air Reserve, 52-56, 63, 64, 66, 67, 97, 110, 117, 125-129
 mill operations, crushing, 27-28, 91; flotation, 58, 61, 72, 95, 143

- Mina, NV Mine, 108
 mine accidents, 44, 115-119, 121-122, 136
 mine and mill safety, 35, 86, 115-119, 121-125, 136, 149
 mine reclamation, 145
 mines, Abbott, CA, 122, 124-125; Altoona CA, 89-90; Ashby, NV, 138, 140; Cactus Queen, CA, 86-87; Corona, CA, 1-36, 63, 73, 75-83, 85, 86, 88, 92, 121, 123, 130, 146; Coulterville, CA, 129-131; Ely, NV, 5, 77; Garfield, NV, 138, 140, 145-146; Gold Hill, OR, 37; Great Western, 90, 92; Guadalupe, CA, 103-104, 124; Helen, CA, 84-85, 123; Independence, NV, 88-89; Jackpile, NM, 132; Ladd, CA, 87; Leadville, NV, 130-131; Lueshi, Congo, 96; Mabel, NV, 131, 138, 145, 147; Mina, NV, 108; Mirabel, CA, 90, 92; Mount Jackson, CA, 25; New Almaden, CA, 14, 79, 103-104; New Idria, CA, 79, 104; Oat Hill, CA, 3-4, 8-9, 16; Pachuca, Mexico, 105-107, 109; Philipsburg, MT, 3, 68, 70-72, 76; Reed, CA, 4, 25, 90-92; Saline Valley, CA, 115-119, 121; Silver Peak, NV, 143; Socrates, CA, 122-123; Tracy, CA, 3, 67-69, 72-73, 87, 92; Wenden, AZ, 92-94
 Mirabel Mine, CA, 90, 92
 Mock, Rupert, 68-69
 Mojave Mining and Milling, 3, 7, 92, 95
 Mount Jackson Mine, CA, 25
 mucking machine, 69

 National Lead, Barite Sales Division, 57-59
 Natomas, 62-63, 108
 Nevada Minerals Commission, 137-138, 140, 150

 New Almaden Mine, CA, 14, 79, 103-104
 New Almaden Partners, 79
 New Idria, CA, 79, 104

 Oat Hill Mine, CA, 3-4, 8-9, 16
 oil in the ore, 10-12, 16
 open-pit mining, 5-8, 64, 68-69, 73, 77, 124

 Pachuca Mine, Mexico, 105-107, 109
 Pacific Foundry, 8-9
 Palmer, Walter, 152-153
 Park City, Utah, mines, 2
 Pennzoil, 103
 Philipsburg, MT, manganese mine, 3, 68, 70-72, 76
 Phillips Brothers, 98
 Phillips, Forrest, 61-63
 Placer Company, 13
 Powerine Oil Company, 132-134
 price, of antimony, 59; of copper, 88; of gold, 41, 43, 88, 140, 148; of mercury, 14, 24, 25, 75, 88, 90, 143
 processing of gold ores. See mill operations

 quicksilver mining, 16, 122-123.
See also mercury mining
Quicksilver in California, 19-20
 Quist, Martin, 10-11, 63-64, 105

 Ravens Manufacturing Company, 20-21
 Reed Mine, CA, 4, 25, 90-92
 Reed, Orrin, 89, 125
 retorts, 17-18, 21, 26-27;
 Pacific Foundry D, 8-9, 18;
 pipe, 8-10
 rhodochrosite, 70
 Rivera, Bob, 87
 Rowland, Tom, 75

safety, in mines. See mine and mill safety
 Saline Valley, CA, talc mine, 115-119, 121
 salivation, 122-123
 sampling, 10-12, 57-58, 61-64, 82, 91, 92-102, 105, 107-109, 129-131, 135-137
 Schneider, Jimmy, 79
 School of Mines, Houghton, Michigan, 37
 Scott furnace, 14-15, 17, 19-20, 25-26
 silver mining, 130-131, 147
 Silver Peak Mill, NV, 143
 slusher, 6, 81
 Smythe, Bill, 152
 Socrates Mine, CA, 122-123
 solvent extraction, 133
 Sonoma International, 83
 Sulphur Bank Mine, CA, 13, 23, 28, 30-31, 79, 82
 Sunshine (Company), 143
 Swent, Langan, 144

talc mine, 115-119, 136-137
 tantalum, 95-102
 taxes, on mining interests, 144-147
 Taylor, Al, 2-3, 73-74, 76-77, 87
 Taylor-Knapp [T-K] Company, 2-3, 5, 6, 67-77, 79, 93, 132
 theft, 25, 28, 31, 146-147
 Toulon Mill, Lovelock, NV, 58
 Tracy, CA, manganese mine, 3, 67-69, 72-73, 87, 92
 tuff, 14-15, 20
 tungsten mine, Korea, 66; Linka, 48

U.S. Bureau of Mines, 69, 110-112
 U.S. Geological Survey [USGS], 104
 Union Carbide Ore Company, 95-103, 105-107
 Universal Silvers, 78, 90, 92

University of Nevada, Mackay School of Mines, 47-49, 53, 55, 67, 130-131, 143
 uranium, 119
 Utah Exploration, 103

Vallejo Quicksilver Mining Company, 2, 76, 77
 Veterans Administration, 59
 Volo Mining, 60-66

water quality, 26
 water shortage, 3-4
 Wells, Johnny, 61-62, 95, 135
 Wenden Mine, AZ, 92-94
 West End Consolidated, Tonopah, 141
 Wickenburg, AZ, mill, 95
 Wilbur Springs, CA, 4-5, 16, 20, 28, 77
 World War I, 18-19, 37
 World War II, 17, 38, 48-53, 58, 152; War Production Board, 88

Yracibil, Vince, 9

Zeltner, Leo, 90, 115-119, 122, 124-125, 130

Eleanor Herz Swent

Born in Lead, South Dakota, where her father became chief metallurgist for the Homestake Mining Company. Her mother was a high school geology teacher before marriage.

Attended schools in Lead, South Dakota, Dana Hall School, and Wellesley College, Massachusetts. Phi Beta Kappa. M.A. in English, University of Denver. Assistant to the President, Elmira College, New York. Married to Langan Waterman Swent, mining engineer.

Since marriage has lived in Tayoltita, Durango, Mexico; Lead, South Dakota; Grants, New Mexico; Piedmont, California.

Teacher of English as a Second Language to adults in the Oakland, California public schools. Author of an independent oral history project, Newcomers to the East Bay, interviews with Asian refugees and immigrants. Oral historian for the Oakland Neighborhood History Project.

Interviewer, Regional Oral History Office since 1985, specializing in mining history. In 1998, awarded LL.D. by South Dakota School of Mines and Technology.

BANC
MSS
2000/80
C

U. C. BERKELEY LIBRARIES



C068216646

